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Book reviews and notices

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The last Book Reviews and Notices section appeared in Mycotaxon **102**: 431-456 (October-December 2007). It had been my intention to include the next one in the last volume of 2008, but I was unable to achieve this because of some problems with my eyes that have now appear to have been satisfactorily resolved. I wish to apologize to readers for this, which has meant that reviews have been slower in appearing than I would have liked. It is therefore planned to include a batch of Book Reviews and Notices in addition to the present one in the last issue of 2009.

General

Fungal families of the world. By Paul F.Cannon & Paul M. Kirk. 2007. CAB International, Nosworthy Way, Wallingford, Oxfordshire OX10 8DE, U.K. (e-mail: cabi@cabi.org). Pp. xiii + 456, col. illustrations *ca* 900. ISBN 978-0-85199- 827-5. Price £ 95.

This sumptuous, almost coffee-table, large-format book has its origins in an unpublished ascomycete course manual prepared for courses held at the then International Mycological Institute by Paul Cannon, David Minter, and me around 1990. The original concept of descriptions, illustrations, and key literature has been retained, but the text and illustrations have been rewritten and re-sourced respectively and now all phyla of kingdom *Fungi* are covered. Phyla traditionally treated as fungi but now placed in other kingdoms, notably the *Chromista* (*Straminipila*) and *Protozoa,* which they refer to as "fungal analogues," however, are not covered here. While I well appreciate the academic reasons for this spreading trend in mycological works, I perceive a danger of these "fungal analogues" becoming orphans of key reference works with none of their own.

[1] Books for consideration for coverage in this column should be mailed to the Book Review Editor at Milford House, The Mead, P.O. Box 152, Ashtead, Surrey KT21 2LZ, U.K. (d.hawksworth@nhm.ac.uk). All unsigned entries are by the Book Review Editor.

A relatively short Introduction includes an impressive list of 88 mycologists who have contributed photographs, amongst whom George Barron, Yves Deneyer, David Ellis, Robert Lücking, Bill Malcolm, Jens Petersen, Einer Timdal, and Chris Walker are singled out for special mention. This is followed by a somewhat daunting six-page General Bibliography of key publications arranged alphabetically within phyla. Then follows the heart of the work — 383 pages devoted to 536 accepted families arranged in alphabetical order. For each family the author citation and date of valid publication is given, followed by the ordinal (where known) and phylum placement, description, note of "significant genera," information on distribution, economic significance, ecology, selected literature references, and in most cases illustrations – most of which are in colour. The illustrations make this a "must have" work, especially the coloured DIC photomicrographs, though the quality is somewhat variable. However, these and some of the macro-shots must be the first of the genera ever to appear in print in colour. A substantial glossary (53 pages) follows, and the work concludes with a list of accepted (in bold face) and frequently cited (in regular type) family names, with synonyms cross-referenced, and all with places of publication.

While the work was sufficiently up-to-date to include family names and some literature published in 2007, family classifications in many groups of fungi are still in flux and acceptance here should not be taken as the latest information available. For example, both family names treated on p. 15 (viz. *Aporpiaceae* and *Appendicisporaceae*), are now being treated as synonyms of *Auriculariaceae* and *Ambisporaceae* respectively.

There are the inevitable minor glitches, but it would be petty to comment on those. My only major "beefs" are the lack of an outline classification to show the families in the fungal hierarchy, and the lack of an index to genera mentioned in the text or figure legends. However, in general the book has been prepared meticulously, and the authors are to be congratulated on what will be seen as a major landmark work, and an essential companion and supplement to the recently published tenth edition of Ainsworth & Bisby's Dictionary of the Fungi (Kirk et al. 2008)– which will be reviewed in the next series of Mycotaxon Book Reviews .

Kirk PM, Cannon PF, Minter DW, Stalpers JA (eds) (2008) Ainsworth & Bisby's Dictionary of the Fungi. 10th edn. CAB International, Wallingford.

Compendium of soil fungi. By Klaus H. Domsch, Walter Gams & Traute-Heidi Anderson. 2007. 2nd edn revised by W. Gams. IHW-Verlag, Postfach 1119, D-85378 Eching bei München, Germany (e-mail: dr.schmid@ihwverlag.de). Pp. 672, figs 382. ISBN 978-3-930-176-69-2. Price 149 €.

This new edition of the Compendium of soil fungi is welcome for two reasons. The reprint of the first edition, already dated 1980, has been out of stock for

some years, and the subsequent numerous taxonomic and nomenclatural changes, as well as the accumulation of new data in the ecology, physiology and metabolism of those fungi, necessitated a revision. This revision was thankfully performed by Walter Gams. The number of compiled species, which was 209, has not changed much, but 52 name changes, mainly due to the development of molecular taxonomy, have been integrated. Eight generic names are no longer used, and 16 are added, bringing the total number of genera treated to 162. The genus *Memnoniella* disappears into *Stachybotrys*. Twelve species of *Gibberella*, *Nectria,* and *Emericella* are disposed under their anamorphic names in *Cylindrocarpon*, *Fusarium,* or *Aspergillus*. *Nectria inventa* is excluded as not a soil fungus, while *Acrostalagmus luteoalbus*, which is now disproved as being its anamorph, is accepted as a soil species. Some species of *Phialophora* are transferred to *Cadophora* and *Pleurostomophora*. Most former *Gliocladium* species are placed in *Clonostachys,* with *Sesquicillium* as a synonym. Species of *Verticillium* are disposed in *Lecanicillium, Pochonia* and *Gibellulopsis*. Several species of *Paecilomyces* are transferred to *Isaria*, *Paecillium,* and *Paranomuraea*. Four species of *Mortierella* are now to be found in *Umbelopsis*. It should be noticed that the names, *Myrmecridium* and *M. schulzeri* are effectively published in Studies in mycology 58: 57-94 (2007), and the new combination *Gibellulopsis nigrescens* appears in Nova Hedwigia 85: 463-489 (2007), while the reference in the book is indicated as "in press." The new generic and specific names, announced as to be published in 2008, *Paecillium* with *P. lilacinum* and *P. atypicola*, and *Paranomuraea* with *P. carnea* and *P marquandii*, as well as *Lecanicillium fungicola*, are here also considered as "provisional names" and so not effectively published in this book (Art. 34.1). Also to be mentioned is the use of a synonym instead of the correct name *Cylindrocarpon obtusiusculum* in the legend of Fig.108. A mass of new information from 333 recent publications is included, and added to the 7000 references from the first edition. This revised edition required Gams and his collaborators to transfer the original typography into a digital text, which enabled high quality printing by the IHW press.

Analysis of the soil mycobiota has become a necessary component in diverse research domains, such as agriculture, plant pathology, environment, hygiene, and medicine, in addition to mycology. Therefore, this handbook, the Compendium of soil fungi, remains a very necessary tool.

Gregoire L. Hennebert & Cony Decock
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Atlas of invertebrate-pathogenic fungi of Thailand. Vol. 1. By Janet Jennifer Luangsa-ard, Kanoksri Tasanathai, Suchada Mongkosamrit & Nigel Hywel-Jones. 2007. National Center for Genetic Engineering and Biotechnology (BIOTEC),

113 Thailand Science Park, Phaholyothin Road, Khlong 1, Khlong Luang, Thani 12120, Thailand (e-mail: lab@biotec.or.th). Pp. 82, col. plates 31. ISBN 978-974-229-522-6. Price US $ 35.

This volume deals with 31 species of entomopathogenic fungi belonging to the genera *Akanthomyces* (3 spp.), *Aschersonia* (8), *Beauveria* (2), *Gibellula* (2), *Hirsutella* (1), *Hypocrella* (2), *Isaria* (5), *Metarhizium* (2), *Nomuraea* (1), *Ophiocordyceps* (4), and *Paecilomyces* (1). Nigel Hywel-Jones is one of the leading world specialists on entomogenous hypocrealean fungi, and, along with ten other contributors, he has now started to document his favourite fungi in Thailand. Each species has a double-page spread: that on the left has the accepted name and synonyms (with places of publication of the names), an indication of any anamorph-teleomorph connection, a description of the species in nature and in culture, and indication of the distribution, and key references; the facing right-hand pages have composite colour plates showing the species on a host, with sections, squashes, and cultures. The plates are extraordinarily glossy, and appear to have been produced by an unusual but very successful method. This new volume must inevitably be compared with that of Tzean et al. (1997) on the entomopathogenic fungi of Taiwan, which they cite. That book has keys and includes many more species, and has fuller descriptions as well as line drawings of critical microscopic features as well as coloured habit macro-photographs and half-tone microscopic ones; they also cite the actual specimens examined. The Thai work will certainly become more useful to those working on entomogenous fungi in the tropics as further volumes are issued, and especially if more aspects of the Taiwanese book can be emulated.

Tzean SS, Hsieh LS, Wu Wj (1997) Atlas of entomopathogenic fungi from Taiwan. Council of Agriculture, Taipei, Taiwan.

Topicós sobre diversidad, ecología y usos de los hongos microscópicos en Iberoamérica. Edited by Gabriela Heredia Abarca. 2008. Instiuto de Ecología A. C., Km 2.5 Carretera Antigua a Coatepec 351, Congregación El Haya, Xalapa 91070, Veracruz, México (e-mail: gabriela.heredia@inecol.ed.mx). Pp. 372, illustrated. ISBN 970-709-104-5. Price none (free while stocks last).

This multi-authored book, which has been prepared by 15 authors from six Spanish-speaking countries, is the product of a four-year project under the Programa Iberoamericano de Ciencia y Tecnología el Desarrollo (CYTED) initiated in 2003 to examine the diversity, ecology, and uses of microscopic fungi in Iberia and Latin America. It starts with a well-illustrated overview of microscopic fungi, their physiology, reproduction, life-styles, roles in ecosystem processes, and chemical products. Eighteen chapters are arranged under the three topics of diversity, ecology and uses, with six in each. All chapters are in Spanish, but each has a short abstract in English.

Those in "Diversidad" address saprobic hyphomycetes from native forests in Argentina, conidial fungi in the semi-arid regions of Brazil, soil ascomycetes in Spain, saprobic conidial fungi in Mexico, strategies for the conservation of fungi in Cuba, and the application of phylogenetic methods to the classification of conidial fungi. Under "Ecología" the chapters are concerned with interactions in soil, the rhizosphere, species in soil in an *Araucaria-Nothofagus* forest, effects of farming soil on *Glomeromycota*, species associated with orchids, and enzymes involved in arbuscular mycorrhizas. And under "Usos" are contributions on biological potential and chemical products, entomopathogens and possible applications in agriculture in Chile, bioconversion of oil mill residue, laccases and their biotechnological potential, and potential for the biodegradation of hydrocarbons.

The book has evidently been lovingly carefully prepared and edited. The chapters are well illustrated, with many photographs, diagrams, and highlights in tables making it pleasing to read. The cross-Atlantic dialogue that has led to this work is most welcome, and while the result is no comprehensive overview of the diversity of microfungi in Iberia or Latin America, it does provide an indication of their importance and potential in the regions. This will be valuable when making cases for funding mycological work, and also includes much material that can be used in teaching applied mycology. It is gratifying that this is yet another example of a book made available free with the support of funding agencies in a Spanish-speaking country, in this case through the project funding from CYTED. This an information dissemination model that merits emulation by other national regional, and international agencies. I encourage Spanish-speaking mycologists involved in teaching to request a copy while stocks are still available.

Glossário ilustrado de micologia. By Jair Putzke & Marisa Terezinha Lopes Putzke. 2004. EDUNSIC, Av. Independêcia2293, 968150900 Santa Cruz do Sol – RS, Brasil (e-mail:editor@unisc.br). Pp. 152, illustrated. ISBN85-7578-062-X. Price RS 45.

The availability of glossaries in national languages is important to the development and teaching of mycology. Today, Portugal has a thriving mycological community, and while attending the fifth Congresso Brasiliero de Micologia in Recife in 2007 I encountered this attractive glossary prepared by two colleagues who had previously produced Os reinos dos fungos (2002, 2 vols, EDUNSIC, not seen). This is the first glossary in Portuguese to come to my attention since the longer Dicionário micológico of Fidalgo & Fidalgo (1967). It covers all groups of fungi, including lichens, and in addition to descriptive and developmental terms has entries for organizations and collections, some chemical products, diseases caused by fungi, life-styles, and even short biographies. It is neatly illustrated with a mixture of half-tone

photographs and line sketches. While not on the scale of Ulloa & Hanlin's (2006) dictionary in Spanish (reviewed in Mycotaxon 102: 431-434, 2006), this little glossary is sure to be a boon to the new generation of Portuguese-speaking mycologists on both sides of the Atlantic.

Fidalgo O & Fidalgo MEPK (1967) Dicionário micológico. Rickia, suppl. **2**: 1-232.

Ulloa M & Hanlin RT (2006) Nuevo diccionario illustrdo de micologia. American Phytopathological Society Press, St Paul, MN.

Tesoros de nuestros montes: trufas de Andalucía. By Baldomero Moreno Arroyo, Javier Fernández Gómez & Elena Pulido Calmaestra. 2005. Consejería de Medio Ambiente, Junta de Andalucía, Avenida Manuel Siurot 50, ES-41071 Sevilla, Spain (http://www.juntadeandalucia.es/medioambietale/sitWeb/contactar/). ISBN 84-96329-68-2. Price 24 €.

"Sumptuous" immediately came to mind when I first paged through this hefty book. Its large size (50 × 27 cm), high quality paper, the magnificent, full color illustrations gracing most of its pages, and even the endpapers that feature a beautiful enlargement of the patterned gleba of a *Tuber* species are consonant with its title, "Treasures of our mountains: truffles of Andalucía." It even has a fabric bookmarker sewn into the binding, a feature not often seen in books published after the 19th century. The list price is amazingly low for books of this quality, which nowadays commonly sell for 100 US$ or more. That said, let us consider the content.

The book is divided into six parts. After 14 pages of title, table of contents, acknowledgments, etc., Part 1 consists of about 90 pages of introduction with ten chapters: what truffles are; truffles in the world; the truffles of Andalucía; anatomy, composition and biological cycle; the union of the three kingdoms (plants, fungi and animals); the truffle in the Andalucian mediterranean woodlands; use and value of truffles; how truffles are hunted; truffle cultivation: harmony between nature and economics; and conservation of wild truffles. Part 2 of about 200 pages is the guide to the 81 species found to date in Andalucía, including an illustrated description of all species except *Zygomycota* and *Glomeromycota,* together with a listing of species with synonyms, and keys to the accepted species. Finally, Parts 3-6 are respectively a glossary of technical terms, a bibliography, a list of abbreviations used, and a species index.

Part 1: Introduction: about truffles

Chapter 1, "What are truffles?," opens with a dramatic painting of lightning, tree roots, mycorrhizae and truffles to introduce truffles in history, including ancient speculations (myths) about their origin. A new one to me is that they come from the testicles of Adonis, buried and multiplied by The Furies. Indeed, one Spanish term for a truffle is "turma de tierra," literally a testicle of the earth (we'll return to "turma" later). The relationship of hypogeous to epigeous

fungi is briefly noted. Chapter 2 deals with truffles around the world, "truffles" here referring to all hypogeous fungi. The authors make the interesting point that most knowledge about truffles has been developed in the 30 % of Earth's land surface, that lying between 30° and 60° N. The well-known truffles of the southern African Kalahari Desert are not mentioned. Speciation endemic to various continents is briefly discussed. Chapter 3 introduces the truffles of Andalucía, noting the excellence of oaks as mycorrhizal hosts, and listing more than 40 species associated with oaks. These chapters are brief, intended to alert readers to these considerations but not deal with them in detail.

Chapter 4, on anatomy, composition, and the biological cycle of truffles, initiates the details of truffle anatomy. The text is sparse but more is not needed, because each anatomical structure important in taxonomy is splendidly illustrated by outstanding, crisp, color photographs. The peridial warts of *Tuber aestivum* are shown with commendable clarity. Spores, asci, and basidia are similarly excellent, with examples of both light and scanning electron micrographs. The chapter continues with a truncated discussion of nutritional components of selected species, and a well illustrated, readily understandable, explanation of the tree → mycorrhiza → primordium → truffle → mycophagist → tree cycle. This is followed by Chapter 5 on the "union of the three kingdoms": plant, fungus, and animal. Spore dispersal by animals, including insects and snails, is noted.

An overview of ecology and distribution of truffles in the mediterranean woodlands of Andalucía is presented in Chapter 6. Soils, vegetation, soil fauna, and their relationships to truffle occurrence are described and, no longer surprisingly, wonderfully illustrated by color photographs and paintings. Chapter 7 reviews the use and exploitation of truffles in medicine, gastronomy, and the emergent mycotourism engendered by the mystique of truffles and other edible fungi. Truffle hunting is reviewed in Chapter 8, from pigs and dogs to truffle flies, use of plant indicators, and probing the soil with a pointed staff, to electronic truffle "sniffers." The authors do not believe that electronics will replace the amazing diligence and precision of dogs.

Chapter 9 is titled "the cultivation of the truffle: harmony between nature and economics." The discussion of truffle cultivation is general and not meant to replace the many detailed handbooks on the topic. The term "turmicultura," i.e. truffles of the semi-arid mediterranean matorral (shrublands) and forb/grasslands, is introduced to differentiate them from "Truficultura," referring to species associated with forest trees. As noted above, the term "turma" has a double meaning, so it does not translate readily into other languages. In this book, any truffle associated with mediterranean shrublands is termed a "turma." A turma named for a person, e.g. *Elaphomyces trappei*, is given the common name "turma de Trappe": I was uncertain whether to be pleased or

apprehensive, given how The Furies treated Adonis. In any event, the authors point out that mycorrhization with turmas can be incorporated into programs of using shrubs for erosion control to produce double benefits. A brief discussion of that concludes the chapter.

Moreno Arroyo has long been concerned about conservation and sustainability wild edible fungi. The book treats this topic in considerable detail, with emphasis on truffles. The chapter reflects the considerable thought he has given to the topic; it laid the foundation for the 1st World Conference on the Conservation and Sustainable Use of Wild Fungi in 2007 at Córdoba, which he organized with his colleagues under auspices of the Consejería de Medio Ambiente (Junta de Andalucía 2007a). One product of the conference was the "Fungi of the Earth: Declaration of Córdoba" approved by participants (Consejería de Medio Ambiente, Junta de Andalucía 2007b). The Chapter includes a four-page action plan, and the Declaration itself is reproduced in Mycological research 112: 485–486 (2008). These documents deserve study by all concerned about the conservation and sustainable use of wild fungi.

Part 2: Guide to species

This part, comprising more than half of the book, begins with an outline of the classification (phylum, order, family, genus) of the 81 taxa described and illustrated in the ensuing pages. Unfortunately, herein lies the major weakness of this otherwise commendable book. The taxonomy and nomenclature are based on the 1995 edition of Ainsworth & Bisby's dictionary of the fungi (Hawksworth et al. 1995). That edition was issued just as molecular tools were coming into widespread use in phylogenetic analysis, and even as it appeared it was becoming out of date, especially at the ranks of family and above. Consequently, the taxonomy used by Montero Arroyo and his colleagues is woefully dated back to the early days of fungal molecular phylogeny. In fairness to the authors, much of the new phylogenetic evidence (as presented in Spatafora et al. 2007) was published after the book went to press. Nonetheless, most of the changes for hypogeous fungi were published by 2003, which I guess would have been the last year in which corrections could have been made to the book's manuscript.

This problem does not affect keying out of the genera and species, except that they are organized by phylum, order, and family in the keys. Consequently, the key user bounces needlessly amongst obsolete names of orders and families to get to the name of the specimen in hand. The following tabulation presents updates — as of early 2009 — for those who want to annotate their copy. Genera that need their order and/or family assignments corrected are listed in the order presented on pp. 103-105 of the book (genera with correct order and family assignments are excluded from this tabulation). Currently accepted names of genera, orders, and families are in boldface in the tabulation, obsolete

names are in standard font in parentheses followed by an arrow pointing to the corrected name in boldface. Names that are correct in the book are simply alone in boldface.

Glomeromycota (only the order is given in the book's outline of classification)

Glomus**: (Zygomycota) → **Glomeromycota**; (Glomales) → **Glomerales**; (Glomaceae) → **Glomeraceae

Ascomycota **(all *Pezizales*)**

Balsamia**: (Balsamiaceae) → **Helvellaceae

Picoa**: (Otideaceae) → **Pyronemataceae

Choiromyces**: (Helvellaceae) → **Tuberaceae

Fischerula**: (Helvellaceae) → **Morchellaceae

Hydnotrya**: (Helvellaceae) → **Discinaceae

Genabea**: (Otideaceae) → **Pyronemataceae

Genea**: (Otideaceae) → **Pyronemataceae

Geopora**: (Otideaceae) → **Pyronemataceae

Hydnocystis**: (Otideaceae) → **Pyronemataceae

Labyrinthomyces**: (Otideaceae) → **Tuberaceae

Delastria**: (Terfeziaceae) → **Pezizaceae

Pachyphloeus**: (Terfeziaceae) → **Pezizaceae

Terfezia**: (Terfeziaceae) → **Pezizaceae

Basidiomycota

*(Endoptychum) → **Chlorophyllum: Agaricales**; (Secotiaceae) → **Agaricaceae***

Gautieria**: (Gauteriales) → **Gomphales; Gautieriaceae

Gastrosporium**: (Hymenogastrales) → **Phallales;** (Gastrosporiaceae) → **Clathraceae (?)

Chondrogaster**: (Hymenogastrales) → **Hysterangiales;** (Hymenogastraceae) → **Mesophelliaceae

Descomyces**: (Hymenogastrales) → **Agaricales;** (Hymenogastraceae) → **Bolbitiaceae

Hymenogaster**: (Hymenogastrales) → **Agaricales; Hymenogastraceae

(Octavianina) → Octaviania:** (Hymenogastrales) → **Boletales;** Octavianinaceae → **Boletaceae

Sclerogaster**: (Hymenogastrales) → **Geastrales;** (Octavianinaceae) → **Sclerogastraceae

Wakefieldia**: (Hymenogastrales) → **Boletales (?);** (Octavianinaceae) → **Boletaceae (?).

Melanogaster**: (Melanogastrales) → **Boletales;** (Melanogastraceae) → **Paxillaceae

Hysterangium**: (Phallales) → **Hysterangiales; Hysterangiaceae

Phallogaster**: (Phallales) → **Hysterangiales;** (Hysterangiaceae) → **Phallogastraceae

Gymnomyces**: **Russulales;** (Elasmomycetaceae) → **Russulaceae** (Zelleromyces) → **Arcangeliella**: (Elasmomycetaceae) → **Russulaceae

After the outline of classification, come the descriptions of individual species. Each hypogeous (as opposed to "subhypogeous") species is illustrated by a superb color photo of sporocarps with surface and cross-sectional views, spores, representative plant associates, and a map of its known distribution in Andalucía. Macro- and microscopic characters are adequately described in the text. Habitat, fruiting season, and distribution are briefly discussed, followed by some general observations. Most species are given two full pages, one of which is the sporocarp photo. A line drawing of sporocarps is also presented; because the drawing adds little or no information to that provided by the color photograph, that space might have been better used for additional text.

Six "New" taxa are given four pages each, thereby allowing additional color photos of both macro- and micro characters. The introduction to the guide states that "For new taxa a Latin diagnosis is included as is required," and that is indeed done. Close inspection, however, reveals that none of these species are newly described in this book. All were validly published in journal articles between 1998 and 2002, so the Latin diagnoses in the book are superfluous.

"Subhypogeous" taxa are treated separately, and include substipitate sequestrates or partly submerged ascomycetes such as *Sarcosphaera* and several *Geopora* species. Each of these is allotted one page with a color photograph of sporocarps. The text material covers the same ground as for the hypogeous taxa.

For the most part, species identifications and nomenclature appear to be good, although I question a few. These problems are due more to a lack of adequate generic monographs and a need for molecular data than to any lack of diligence by the book's authors. *Choiromyces gangliformis* is actually an immature specimen of *C. meandriformis*, the latter name having priority. Molecular studies have shown few hypogeous species overlap between North America and Europe, even though some are morphologically similar. With that in mind, I question the identifications of *Genea compacta* and *G. thaxteri,* both first described from North America. *G. compacta* was originally described as brown and lacking peridial hairs, whereas the collection from Andalucía is blackish brown to black and has peridial hairs; it may actually be *G. pulchra*. *G. thaxteri* from Andalucía is dark brown to blackish and has slightly larger spores than the brown type from North America. The book's illustration of *Geopora cooperi* shows minute peridial warts, a feature lacking in specimens from North America where the species was originally described. These Andalucian collections need restudy. The book's *Rhizopogon roseolus* actually conforms to the quite different *R. vulgaris*, INDEX FUNGORUM notwithstanding.

I noticed a few errors in author citations: "*Hysterangium clathroides* Vittad. var. *clathroides* Vidal" should drop "Vidal," as the varietal epithet is an autonym, i.e., the name of the type variety with is automatically fixed by the species name. Occasional other errors here and there are trivial.

A list of synonyms for each species follows the descriptions, and in turn is followed by the keys, which are easy enough to use. The nomenclatural confusion at order and family ranks as noted above does not interfere with the use of the key so long as they are ignored.

Parts 3 – 6

These parts consist of a glossary, bibliography, list of abbreviations, and index to species, respectively. All are useful, but literature citations from after 1999 are scarce, reflecting in part the lack of attention to molecular advances in our understanding of phylogeny of hypogeous fungi.

Conclusions

At its very reasonable price, this book is worthy for the beautiful illustrations alone. Beyond that, the introductory chapters overview the range of truffle phenomena: history, traditions, biology, ecology, uses, harvesting, cultivation, conservation and sustainability, and taxonomy. I am far from fluent in Spanish, but with a Spanish-English dictionary at hand I found the text easy to read. The authors are particularly thoughtful about conservation, sustainability, use of some species as mycorrhizal inoculum in erosion control programs, and the importance of public education in all these activities. Although the focus is on truffles of Andalucía, it well represents the hypogeous mycobiota of the mediterranean oak woodlands and semi-arid shrublands. Its primary flaw, the outdated nomenclature above the genus level, needs to be recognized, but does not impede use of the book for species identification. I hope the authors will be able to issue a revised and corrected edition in the not too distant future.

Consejería de Medio Ambiente, Junta de Andalucía (2007a) 1st World conference on the conservation and sustainable use of wild fungi: technical presentations and posters. Consejería de Medio Ambiente, Córdoba.

Consejería de Medio Ambiente, Junta de Andalucía (2007b) Fungi of the earth: declaration of Córdoba. Consejería de Medio Ambiente, Córdoba.

Hawksworth, DL, Kirk PM, Sutton BC & Pegler DM (1995) Ainsworth & Bisby's dictionary of the fungi. 8th edn. CAB International. Wallingford. 616 pp.

Spatafora JW, Hughes KW, Blackwell M (eds.) (2007) ["2006"] A phylogeny for kingdom *Fungi*: Deep Hypha Issue. Mycologia 98: 829-1105.

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Manual de truficultura Andalucía. By Marcos Morcillo Serra, Baldomero Moreno Arroyo, Elena Pulido Calmaestra & Mónica Sánchez Sánchez. 2007. Consejería de Medio Ambiente, Junta de Andalucía, Avenida Manuel Siurot 50, ES-41071 Sevilla, Spain (http://www.juntadeandalucia.es/medioambietale/site/Web/contactar/). Pp. 176, illustrated. ISBN 978-84-935194-3-8. Price not indicated.

This delightful small-format guide to truffle cultivation is partly based on the above, but the main emphasis is on the practicalities of cultivation and production in the Province of Andalucía.

Chytridiomycetes, Oomycetes, and Protozoans

Brazilian zoosporic fungi. By Adauto Ivo Milanez, Carmen L. A. Pires-Zottarelli & Alexandra L. Gomes. 2007. Instituto de Botânica, Caixa Postal 3005, São Paulo, SP 01061-970, Brasil. Pp. 112. ISBN 978-85-907435-0-7. Price not indicated.

This is essentially a checklist of the zoosporic fungi of Brazil, including 328 species, which represents an increase of 46 % since the last compilation by the first author in 1999. These belong to *Plasmodiophoromycetes* (4 spp.), *Chytridiomycetes* (129), *Hyphochytridiomycetes* (4), *Labyrinthulomycetes* (4), and *Oomycetes* (187). For each species the original place of publication of the name is given, followed by details of the Brazilian collections with states, localities, source (including host plants), and literature references. That the references now extend over 22 pages testifies to the heightened interest in these fungi that has occurred in Brazil over the last ten years. The work also has an index to species and one to hosts. For some reason that escapes me, the author citations of hosts are given in the host index; they would have been better omitted entirely from the work, as this is not a plant taxonomic treatise! In summary, this will be a key reference work for all mycologists and plant pathologists concerned with zoosporic fungi and the diseases they cause in Brazil.

Zygomycetes

Guía de bolsillo de las Zigomicosis Invasoras. Edited by Amalia del Palacio, José Pontón, Josep Guarro & Guillermo Quindós. 2008. Revista Iberoamerica de Micología, Apartado 699, ES-48080 Bilbao, Spain. Pp. xi + 105, col. illustrations. ISBN 978-84-612-1887-5. Price not indicated.

This little booklet, in Spanish, comprises ten chapters, which collectively provide a synopsis of the fungi involved in zygomycoses, their clinical morphs, methods of diagnosis, and therapeutic treatments. It includes information on the incidence of these mycoses, predispositions to infections, and mortality rates. While not primarily a systematic work, this will be a useful addition to the shelves of mycologists in medical pathology laboratories.

Basidiomycetes

A manual and source book on the boletes and their allies. By Roy Watling. 2008. Fungiflora, P.O. Box 95, Blindern, N-0314 Oslo, Norway (e-mail:leif.ryvarden@bio.uio.no). Pp. 248, plates 17. [Synopsis fungorum vol. 24.] ISBN 978-82-90724-36-3. Price 300 NOK.

This is a welcome addition to the series that has recently, in the main, dealt with non-European species. It is a reference volume that contains much needed information on this group, which was unavailable in a comprehensive, form till now. The editors have made an admirable choice of author by inviting Professor Roy Watling to prepare this volume.

Many people know of my interest in *Boletus*, and therefore this new publication is "a must for my own bookshelf." However, this book holds countless amounts of information that Roy has accrued whilst enjoying a lifetime in mycology, and these would be of interest for the more generalist mycologist.

In the introduction he says "The outline of this book is quite simple, in that all genera currently placed in the *Boletales* are arranged alphabetically;" indeed all 79 genera are covered. Then, where appropriate, the history of each genus is comprehensibly described – on reading this adeptly written section, I realized to my shame how little we all really know about *Boletaceae* taxonomy. After that, are interesting chapters on rejected names, genera & families and ecology, but it is the key to genera that really is impressive, well written and very informative. This all relates wonderfully to the 17 plates which are very descriptive sketches prepared by the author in his "unique way," a style that we have come to recognize from his many other publications. His last sentence reads: "This book attempts to be as up-to-date as possible," a bold statement indeed in the fast changing world of molecular studies, but correct in most parts, especially considering he has been working on this massive task for only 12 months.

A very good 11-page glossary is included, in addition to two reference sections and 26 pages of specific references; all this useful information is now in one volume when previously it was hard to find when it was needed.

My only disappointment is that the copy I am using is already coming apart, with the pages falling out due to defective finishing at the printers. Yes, I have used it a lot, and I am sure that others will in the future. It is well worth having on your bookshelf. Thank you, Roy Watling, for this work.

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Monograph of *Marasmius*, *Gloiocephala*, *Palaeocephala* and *Setulipes* in tropical Africa. By Vladimir Antonín. 2007. National Botanic Garden of Belgium, Domien van Bouchut, B-1860Meise, Belgium. Pp. 1173 pp., col. plates19, half tone figs119. [Fungus flora of tropical Africa. Vol. 1.] ISBN 978-90726197-30. Price 50 €.

This publication, the first part of many I hope, is a logical continuation of Flore iconographique des champignons du Congo and Flore illustreé des champignons d'Afrique Centrale which it is proposed to replace in the years to come. This commencing part sets a standard that will be hard to follow. The Foreword by Jan Rammeloo and Jérôme Degreef describes the history of the concept of a Fungus flora for tropical Africa and the aspirations of the authors and editors to improve our knowledge of African biodiversity.

What better to commence the work with a monograph of *Marasmius* and its allies, because they are widespread in the tropics and appear to be always present when on collecting trips to the rainforest.

After a short introduction to the macro- and micro-characters used in identification, the reader is plunged directly into the taxonomic part with an interesting history of *Marasmius* collecting in Africa. A very useful key is offered to the marasmioid and collybioid genera, which will undoubtedly stand the test of time for those working in the field even though molecular data is showing that many constituent elements are polyphyletic. A key follows to the sections, subsections and series of *Marasmius*, which will be seen to draw strongly on the earlier work by Singer; indeed that author made a contribution on *Marasmius* in the Congo and environs in 1965 in part of the Flore iconographique.

The work is divided into nine sections with four subsections and a handful of series covering in all 102 different taxa. Some sections are represented by a single member, such as *Fusicystidiae* with *M. longicystidiata*, or a whole host of species as is found in sect. *Globulares* with 22 members. With each section there is a key to assist in identification. Each species is fully described both as seen in the field and after microscopic examination, and all are illustrated with line drawings of the salient features. The ecology, distribution (as some of the species are not confined to tropical Africa), and material (sometimes with revised classical collections), are fully documented with an additional section on notes on it and related taxa.

The same formula is used for *Gloiocephala,* with *Palaeocephala* with a single species incorporated into the key, and *Setulipes*, a genus described by Antonín in 1987 to cover *Marasmius* sect. *Androsacei.* Thus, the familiar Horse-hair fungus is now allocated to a separate genus. There are seven species described for each of these two genera.

Most species are illustrated in colour, either by watercolours or photographs obtained from a series of sources. Most will be helpful in identification, but the quality, as one might expect, varies because of the various sources. One source

used is Mme M. Goossens-Fontana dating back to her time as a drawing teacher based in the Eala Botanic Garden, Congo in the 1920s, and on which the Flore iconographique was strongly based. The coloured plates number 19 and follow all the keys translated into French. This is an important and admirable addition, as many of the field workers will have French as their adopted tongue. Before these keys, there is a considerable compilation devoted to excluded and doubtful species, covering 15 pages; it makes interesting reading. Seventy-five names published in *Marasmius* from Africa, many introduced by P. Henning, are considered based either on the original description, because material is not available, or after an examination of the type or authentic material.

This publication is a must for anyone studying the marasmioid/collybioid agarics wherever they may be stationed, and it is an example of extraordinary careful work. I knew this work was in progress, and it has taken some time to come to fruition, but it has been well worth waiting for.

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Fungi of Cameroon: Ecological diversity with emphasis on the taxonomy of non-gilled hymenomycetes from the Mbalmayo forest reserve. By Clovis Douanla-Meli. 2007. J. Cramer in der Gebrüder Borntrager Verlagsbuchhandlung, Johannesstrasse 3A, D-70176 Stuttgart, Germany (e-mail: mail@schweizerbart.de). Pp. viii + 410, figs 172, tables 17. [Bibliotheca mycologica No. 202.] ISBN 978-3-443-59104-5. Price 89 €.

This publication is an extremely inspirational document, though sometimes it has rather quaint phraseology, which makes the reader stop and read again for clarity.

The main part of the book (289 pp.) comprises excellent descriptions of the non-gilled hymenomycetes found along eight plotless transects of 1000 × 20 m in four land-use types (near primary lowland forest, old-growth secondary forest, cleared areas with fallow of different stages and cropland) within the Mabalmayo forest reserve, situated in southern central Cameroon. All are supported by clear and effective line drawings and keys. There are 140 species described including 11 gasteromycetes (Birds' nest fungi and one stinkhorn) and 10 jelly fungi; 11 new species are described and a single new combination is made; and 75 are new records for Cameroon. The classification adopted is primarily on macro-morphology, using such groupings as stereoid fungi. stipitate stereoids, clavarioid fungi, etc. Such a treatment is useful, although it does not reflect natural groupings now revealed by molecular studies. This section is where the non-gilled part of the title is evident but the 'topping and tailing' of this descriptive data is full of equally important information.

Although the full title is explanatory, I doubt whether the reader realises when opening the book what a mine of information there is between the pages, and so full appreciation of the work involved may not at first be appreciated. There is certainly more to this volume other than non-gilled forms, as information on such topics as the distribution and ecology of agarics and larger ascomycetes are also addressed. I was amazed at the fundamental differences between the mycological constituents of transects I have made and the author's, as these were in areas not that distant from one another in Cameroon. However, explanations are offered for this and the fall off in mycodiversity between woodland areas, arable ones, etc.

The physical, climatic, and anthropogenic factors of the area are covered adequately, and the historical account of earlier collecting in Cameroon is an excellent distillate, appealing to a wider audience. I do, however, seriously wonder whether the taxonomic part should have been published separately from the details on collecting, monitoring, assessing mycodiversity, gathering meaningful ethnomycological data, and applying statistically sound techniques for analysis, as these include groups other than the non-gilled forms. Those accounts would be extremely valuable brought together as a separate publication as they would be of benefit to anyone collecting in the tropics, and not just Africa. Indeed, they should be read by all venturing into these parts of the world wishing to carry out mycological work. Perhaps this could be produced as part of the proposed extended project.

This is a well-documented publication worthy of the efforts of a well-seasoned mycologist, let alone just the subject of a thesis. 700 samples were analysed, 70 % basidiomycetes and 21 % ascomycetes. The time spent over all aspects covered must have meant the author spending many, many hours of the day collecting, identifying, and mulling over the finds. It was truly a labour of love – in all, 271 different fungi covering all groups were identified.

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Smut fungi of the Indian subcontinent. By Kálmán Vánky. 2007. W. Szafer Institute of Botany, Polish Academy of Sciences, Lubicz 46, PL-31-512 Kraków, Poland (e-mail: ed-office@ib-pan.krakow.pl). Pp. 1-265, figs 86. [Polish botanical studies, vol. 26.] ISBN 978-83-89648-59-4. Price 48 €.

The smut fungi of the Indian Subcontinent (including Pakistan, Nepal, Bangladesh, India, and Sri Lanka) are represented in this book by 369 species belonging to 45 genera. The main body of the book consists of genera and species descriptions. A key to the genera, and keys to the species within each genus are compiled, and a host plant/ smut fungus index is given to

facilitate the identification of these species. Each genus is illustrated by a selected, representative species, with a drawing of its habit and SEM and/ or LM photomicrographs of the spores. Each species description includes nomenclatural data, information about morphology of the sori, microscopic features of the spores, including wall ornamentation as seen by LM and SEM, germination of the spores (where there is information), general distribution, and known hosts from the Indian Subcontinent. Finally, there are a list of references on the literature on the Indian Subcontinent, and smut fungi and smut fungus/ host plant indexes.

I have a few remarks. *Sphacelotheca himalensis* is included as a member of *Microbotryum,* although this species possesses sori covered by a peridium and with a central columella, and spores initially connected by disjunctors. Vánky still accepts *Microbotryum* in a broad sense, but Denchev et al. (2006) have reduced *Microbotryum* to include only anthericolous species (incl. *M. majus* and *M. savilei*) on *Caryophyllaceae,* and I prefer to treat this genus in a narrow sense. In many species descriptions, the author repeats his measurements from previous studies of the respective species from Europe (e.g. Vánky 1994) or from type studies of species not described from the Indian Subcontinent. In all cases of descriptions, when spore measurements of specimens from the Indian Subcontinent were not made, the author had to reference a previously published source. It is a pity that the known hosts from this area are just listed without information about their exact localities.

This monograph will, however, be very useful and help all mycologists and plant pathologists studying this interesting group of parasitic fungi in the Indian Subcontinent.

Denchev CM, Moore RT, & Shin HD (2006) A reappraisal of the genus *Bauhinus.* (*Microbotraceae*). Mycologia Balcanica 3: 71-75.

Vánky K (1994) European smut fungi. Gustav Fischer Verlag, Stuttgart.

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Fungi of Australia: the smut fungi. By Kálmán Vánky & Roger G. Shivas. 2008. Australian Biological Resources Study (ABRS), G.P.O. Box 787, Canberra, ACT 2601 Australia (e-mail: sales@publish.csiro.au). [Fungi of Australia Series.] Pp. i-viii + 1-267, plates 1. ISBN 978-0-643-09536-6 [+ CD by Roger G. Shivas, Dean Beasley & Kálmán Vánky; containing 1108 black and white or colour figures and 295 distribution maps in colour; ISBN 978-0-643-09537-3.] Price AU$ 130.

The long-term and excellent collaborative research between Kálmán Vánky and Roger Shivas has included numerous collecting trips in Australia, and has yielded many new records of smut fungi for the continent, the description of

new species and genera, and now a monograph of the smut fungi of Australia as a new number of the series Fungi of Australia.

The monograph includes 296 species in 43 genera. About half of these species and six of the genera, *Anomalomyces, Centrolepidosporium, Farysporium, Fulvisporium, Pseudotracya,* and *Websdanea,* are endemic. While the three largest genera, *Sporisorium* (81 spp.), *Tilletia* (34), and *Ustilago* (36), account for more than half of the Australian species, only eight genera are represented in Australia by more than ten species, and 21 genera are known only by a single species. Furthermore, although 32 flowering plant families, 179 genera, and 488 species are known to be infected by smut fungi in Australia, 64 % of the smut species are exclusively parasitic on grasses (*Poaceae*) and 16 % on sedges (*Cyperaceae*).

The introductory chapters provide historical data about the investigations of smut fungi in Australia and general information on the biology of this taxonomic group, valuable for both students and researchers.

The main body of the book consists of a key to the genera of smut fungi and descriptions of genera and species, including keys to the species of each particular genus if more than one species is found in Australia. Each genus and species description includes nomenclatural data, information on the development of the sori and their morphology, microscopic features of the spores and sterile cells (if any), including wall ornamentation as seen by LM and SEM, germination of the spores (if there is information), distribution in Australia and in the world (if the genus/species is not endemic), and plant hosts in Australia. The detailed information about the known hosts, fungus distribution in Australia, and the specimens examined is noteworthy.

A list of doubtful and excluded names is also given. Finally, there are a list of host plants and their associated smut fungi, an appendix with new lectotypifications of four species described from Australia, an appendix with a description of one new species (*Tilletia australiensis*), a list of references, and an index of scientific names of fungi.

The monograph is accompanied by a CD incorporating a Lucid™ Player. The CD provides interactive and dichotomous keys that allow the rapid and accurate identification of the species. The user has easy access to a comprehensive fact sheet about each of the species, which includes a description of disease symptoms and macroscopic and microscopic characters, a map showing distribution in Australia, line drawing(s) and/or scanned specimen(s), light micrograph, and scanning electron micrograph. The CD contains 1108 black and white or colour figures, and 295 distribution maps in colour. The drawings, LM and SEM photomicrographs, distribution maps, are all of high quality and successfully complement the descriptions. The user can browse information by species and generic name of the fungus, or by genus name of the host plant

(through a host index), and can also view supplementary information, which includes a glossary and list of references.

The book and CD provide important information about our current knowledge of Australian smut fungi, and will help all mycologists, phytopathologists, and students interested in this parasitic group of fungi. The information is excellently presented and illustrated, and for anyone who wants to touch the beauty of the smut fungi, I would recommend that they just open the CD of the Australian smut fungi and enjoy.

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Ascomycetes

Now that an increasing number of works are thankfully considering fungi producing ascomata or basidiomata along with their conidial states, in the future all publications dealing with conidial fungi will be treated either here or under "Basidiomycetes" as appropriate.

The genus *Cladosporium* and similar dematiaceous hyphomycetes. Edited by Pedro W. Crous, Uwe Braun, Konstanze Schubert & Johannes Z. Groenwald. 2007. CBS Fungal Biodiversity Centre, P.O. Box 85167, 3508 AD Utrecht, The Netherlands (e-mail: info@cbs.knaw.nl). Pp. viii + 256, figs numerous. [Studies in mycology no. 58.] ISBN 978-90-70351-61-0. Price 65 €.

This remarkable achievement of integrated modern systematic mycology, stunningly illustrated by colour DIC optics photomicrographs, SEMs, half-tones, and line drawings, is dedicated to the late Gerard de Vries (1919-2005), an outstanding CBS mycologist with a broad range of interests, who made the first in-depth attempt to understand species concepts in *Cladosporium* in the broad sense as far back as 1952. It comprises nine articles, involving 21 authors, and represents the cutting-edge of an integrated approach to the molecular and morphological systematics of *Cladosporium* and similar fungi — along with their sexual stages where known.

Crous et al. (pp. 1-32), using new information from LSU sequences, show that *Mycosphaerella*, which has been linked to over 30 genera of conidial fungi, is incredibly polyphyletic and includes species that can be distributed through five families: *Capnodiaceae*, *Davidiellaceae*, *Mycosphaerellaceae*, *Schizothyriaceae*, and *Teratosphaeriaceae* fam.nov. *Teratosphaeria* is separated primarily by the superficial stroma that links the perithecioid ascomata, and 32 species are combined into it for the first time; it has links with 12 conidial genera. Keys to the genera are presented, and in the case of anamorphs, also keys to the species

(e.g. of *Penidella*). Notes on some similar genera for which sequences could not be obtained are included, such as the lichenicolous *Stigmidium* of which fine photomicrographs of the type species are provided.

Crous et al. (pp. 33-56) consider the delimitation of *Cladosporium* from other genera, emphasizing the coronate conidial scars and teleomorphs in *Davidiella*. Other fungi placed in the genus are dispersed through a wide range of orders, including *Capnodiales*, *Helotiales*, and *Pleosporales*. The number of similar genera recognized here is 46, to which a key is thankfully provided and is surely destined to be intensively used.

Arzanio et al. (pp. 57-94) concentrate on *Ramichloridium* and allied genera, including *Periconiella*, *Rhinocladiella*, and *Veronaea*. ITS and 28S sequence data revealed eight clusters dispersed through *Capnodiales*, *Chaetothyriales*, and *Pleosporales*. A key is provided to 11 similar genera, of which five are newly described. I was interested to see that *Zasmidium* was retailed for the "cellar fungus" rather than *Rhinocladiella*, and that this clustered with some *Ramichloridium* species although morphologically closer to *Stenella*.

Schubert et al. (pp. 95-104) find that the fungus causing Cladosporium leaf blotch of *Paeonia* species, previously called *Cladosporium chlorocephalum*, has to placed in a new genus they name *Diplocladosporum* but which nevertheless still belongs in *Davidiellaceae*.

Schubert et al. (pp. 105-156), in what will surely be the most anxiously sought contribution by applied mycologists and pathologists in the set, tackle the *Cladosporium herbarum* complex. Sixteen species are accepted and a key to these is provided. Ten of the 16 are new to science, including four from hypersaline environments, one from an Antarctic *Caloplaca* species, and another causing a disease on *Iris* in New Zealand. Most isolates from human infections are found to belong to *C. bruhnei*. Five species have *Davidiella* teleomorphs, of which two are newly described and named. The complex has low molecular distances between species, and a high degree of clonal or inbreeding diversity, but most are distinguishable by conidial characters – especially spore width. An exception is *C. subtilissimum*, newly described from grapes in the USA.

Zalar et al. (pp. 157-183) focus on the ubiquitous *C. sphaerospermum*, where nine species are recognized and keyed, seven of which are described as new from hypersaline environments of which the complex seems to be characteristic.

Crous et al. (pp. 185-217) consider the opportunistic human pathogenic species in *Herpotrichiellaceae*, and show that *Cladophialophora* is distinct from *Pseudocladosporium*. However, the latter proves to be a synonym of *Fusicladium,* teleomorphs of which belong in *Venturia* of *Venturiaceae*.

De Hoog et al. (pp. 219-234) address the *Cladophialophora carrionii* complex, the causal agents of chromoblastomycosis in humans in arid regions, but which is also known from cacti. The new species *C. yegresii* is described from leaves of

the cactus *Stenocereus griseus*, but remarkably it is less virulent to the plant than are clinical isolates of *C. carrionii*.

Seifert et al. (pp. 235-245) uncover horrendous fundamental problems in the nomenclature of the anamorph of the creosote fungus, *Amorphotheca resinae*. It emerges that the same basionym has come to be used for the anamorph of that species in *Hormoconis*, as well as in the name of the mononematous morph of the resin fungus *Hormodendrum resinae* – a synnematous synanamorph of *Sorocybe resinae*. In order to enable the generic name *Hormoconis* to be retained for the anamorph of the creosote fungus, conservation of the name *Hormodendrum resinae* with a different type is recommended.

This is a pinnacle of achievement for the CBS mycologists and their collaborators. It demonstrates just what can be achieved in making sense of what to most mycologists is an "impossible" genus by combining molecular studies with critical microscopical observations, attention to nomenclatural details, and examining huge numbers of isolates and specimens – and then delivering a result for users in the keys and superb illustrations. The taxonomy of *Cladosporium*-like fungi has been raised to a new level, and all involved in the volume deserve to be heartily congratulated on this major achievement.

***Aspergillus* Systematics in the Genomic Era.** Edited by Robert A. Samson & János Varga. 2007. CBS Fungal Biodiversity Centre, P.O. Box 85167, 3508 AD Utrecht, The Netherlands (e-mail: info@cbs.knaw.nl). Pp. vii + 206, figs numerous. [Studies in mycology no. 59.] ISBN 978-90-70351-69-4. Price 65 €.

Aspergillus systematics is at the forefront of the integration of molecular data, with the genomes of a remarkable nine species now or shortly to become available. There has also been a remarkable degree of international collaboration on the systematics of this genus, and *Penicillium*, fostered by the series of workshops initiated by Rob Samson and John Pitt in 1985. This volume is the output of an eponymous workshop held on 12-14 April 2007, which had 39 participants, and comprises 14 papers.

Geiser et al. (pp. 1-10) review the present state of species recognition and identification, and give the salutary warning that: "There is no one method (morphological, physiological or molecular) that works flawlessly in recognizing species" (p. 3). Ascospore wall characters are questioned, in some cases "multilocus DNA analysis showed that the assignments of anamorph-teleomorph connections were incorrect" (p. 4), and bar-coding using the ITS region and cox1 (which has numerous introns) does not seem possible, from a trial study of 45 *A. niger* isolates. Rokas et al. (pp. 11-17) consider comparative genomics and species concepts and report that four core studies reveal "significant variation in the nature of species boundaries across *Aspergillus*" (p. 11). With respect to sexuality and vegetative compatibility genes, Pál et al.. (pp.

19-30) examine the genes involved in sex and compatibility; *Het* genes regulate the formation of anastomoses and heterokaryons, and where heterokaryons are not tolerated, growth is inhibited leading to cell death. In reviewing the success of secondary metabolite profiling, Frisvad et al. (pp. 31-37) caution that using any one approach could yield misleading results, and they commend a consensus polyphasic approach to taxonomy using examples from *Aspergillus* sect. *Nigri*.

Balejee et al. (pp. 39-45) make recommendations for identifications in a clinical setting against the background of ITS sequences or morphology not being able to certainly identify species within sections; they commend the usage of, for example, the "*A. fumigatus* complex." That there is a major problem in that complex is evident from the contribution by Klaasen & Osherov (pp. 47-51) on strain typing in the genomic era; 16 strains could be discriminated by AFLP's, and variations in the sizes of tandem repeats were possible. Perrone et al. (pp. 53-66) address species in agricultural products; ochratoxin producers on grapes and coffee comprise no less than nine species, including three from grapes and four from coffee that are described as new here.

Pitt & Samson (pp. 56-70) consider the weeping sore of anamorph/teleomorph nomenclature, and discuss historical approaches. They argue for the retention of the dual nomenclatural system, and present an eight-point protocol for the description of new taxa. However, there is an unfortunate misunderstanding of the *Code* as it currently stands when they claim "many industrial users . . . are now familiar with the fact that a teleomorph name on a fungus means ascospores" (p. 69). This is a misconception that is potentially extremely misleading. A teleomorph name is the one to be applied to the holomorph, the fungus in all its forms, and not only that with ascospores! Where a teleomorph is known, that name can also be used for the anamorph as it is part of the same holomorph; for example, *Emericella nidulans* can be used for *Aspergillus nidulans* strains not producing ascospores – fortunately most fungal geneticists are pragmatic and just use *A. nidulans* regardless of what type of spores are being formed to avoid confusion in the literature.

Recommendations of an international panel on species concepts that was convened during the workshop are presented by Samson et al. (pp. 71-73). The panel: (1) considered a polyphasic approach the gold standard; (2) wished to retain the dual system of nomenclature, recognizing the difficulties in changing this; "The majority of the workshop saw the need for a separate fungal nomenclatural code such as the code the bacteriologists use" (p. 72) [– an issue destined to be hotly debated at the 9th International Mycological Congress in Edinburgh next year]; (3) recommended that cultures from the types of newly described species be deposited in 2-3 different open sources; and (4) proposed there should be a simple database for identification and considered its possible content.

The remaining five contributions all consider the taxonomy of different sections of the genus, generally using polyphasic and molecular phylogenetic approaches, and including keys. Varga et al. (pp. 75-88) on sect. *Candida* recognize it as having four species. In sect. *Clavati*, Varga et al. (pp. 89-106) distinguish six species. Sect. *Usti* is found by Houbraken et al. (pp. 107-128) to comprise eight species, one newly described. Sect. *Niger* is examined by Samson et al. (pp. 129-145) who overview identification methods and accept nine species. The final and largest contribution is on sect. *Fumigatus* by Samson et al. (pp. 147-204), which is considered to comprise 33 species, of which 23 have *Neosartorya* teleomorphs, with four species newly described. These last contributions are particularly stunningly illustrated by a combination of DIC photomicrographs and SEM micrographs, with coloured photographs of colonies and some other features.

The publication has clearly been most thoughtfully constructed and edited, and shows what heights can be reached through the collaboration of specialists. It is a model for how progress can be made in unraveling species-rich fungal genera, but requires mycologists of John Pitt and Rob Samson's caliber who have such long-sighted vision.

Indian sarcoscyphaceous fungi. By D. C. Pant & Vindeshwari Prasad. 2008. Scientific Publishers (India), P.O. Box 91, Jodhpur 342 001 (Raj), India (email: info@scientificpub.com). Pp. v + 124. ISBN 978-81-7233-525-0. Price 675 INR.

This slim, well-bound volume, dedicated to Vijai P. Tewari, an emeritus professor of Banaras Hindu University, is based on the detailed morphological study of 78 specimens mainly collected in the Himalayan hills, foothills, and plains, and 20 type or authentic specimens from foreign herbaria. (Two of these are not included, as the genus *Acervus* is now treated in *Pyronemataceae*.) The first 24 pages are devoted to an introduction, an extensive historical review of the taxonomy of discomycetes, mainly *Pezizales,* materials and methods, and a chapter on general morphology (and anatomy). Seventy-seven pages comprise the chapter "Description of Genera and Species." Eleven genera are recognized in the suborder *Saracoscyphineae.* The book title suggests that only the family *Sarcoscyphaceae* is covered, whereas two families, S*arcoscyphaceae* and *Sarcosomataceae* are accepted, divided into five tribes, *Sarcoscypheae, Boedijnopezizeae, Pithyeae, Galielleae,* and *Sarcosomateae.*

Oddly, no keys to the genera or to the species within each genus are provided. Since an index to the scientific names is also missing, and the genera are treated in an unexplained order (that of a table on p. 104), it is rather difficult to locate any genus or species within the book, except by thumbing through it. The 11 accepted genera are *Sarcoscypha, Phillipsia, Nanoscypha, Wynnea, Cookeina, Microstoma, Pithya, Thindia, Galiella, Plectania,* and *Korfiella.* The

last mentioned genus is, in my opinion, probably a synonym of *Plectania.* The authors agree with my concept of *Plectania* in treating the spherical-spored *Pseudoplectania* as a synonym. Almost all species are illustrated, most by many photographs, nine species partly in transmission electron microscopy, and (sometimes very good, sometimes crude) line drawings. Some of the illustrations do not agree with the descriptions, e.g. *Thindia cupressi* is reported to have thick-walled hairs, but is illustrated with a line drawing of a thin-walled hair. For each species a relatively complete synonymy is presented. There is also an extensive bibliography of literature cited.

The authors appear to have somewhat bizarre nomenclatural concepts. In their discussion of the genus *Microstoma* they state: "Korf (1959) transferred *Plectania floccosa* to the genus *Microstoma.* Raitviir (1965) transferred *Sarcoscypha floccosa* (Schw.) Sacc. to the genus *Microstoma* as *M. floccosum* (Schw.) Raitviir." The Korf (1959) reference is to unpublished mimeographed lecture supplements I prepared for my students, and I could not have made any valid transfer there. Moreover, both Raitviir and I would have been transferring a species name, *Peziza floccosa* Schwein., not a later combination.

The treatment of *Cookeina,* in particular, is sketchy and clearly not up-to-date. They describe only two species, *C. sulcipes* [shown by Dennis (1994) and by Iturriaga & Pfister (2006) to have *C. speciosa* as its correct name] and *C. colensoi.* In addition, they note that three other species are reported from India, *C. tricholoma, C. indica,* and *C. mundkurii,* which they did not study. They merely report that "Their description and illustrations, however, are excellent and adequate for identification." Iturriaga and Pfister (loc. cit.) have synonymized *C. mundkurii* with the older *C. indica*."

Despite its many failings, this book does record valuable information on the species studied, and many of the illustrations are truly informative. Happily, there are relatively few typographical errors. It will surely be consulted by specialists for many years to come, all of whom are as likely as I was to be disturbed by some of its shortcomings. I regret I cannot advise individuals to purchase this work, though major libraries will need to add it to their holdings.

Dennis RWG (1994) Plumier's discomycetes. Mycotaxon **51**: 237-239.

Iturriaga T, Pfister DH (2006) A monograph of the genus *Cookeina (Ascomycota, Pezizales, Sarcoscyphaceae).* Mycotaxon **95**: 137-180.

Korf RP, in Fitzpatrick HM & Korf RP (1959) Lectures on mycology, *Ascomycetes*. Plant Pathology Department, Cornell University, Ithaca, NY. [Mimeographed.]

Raitviir A (1965) *Sarcoscyphaceae* in the Far East. [In Russian.] Proceedings of the Estonian Academy of Sciences, Biology **14**: 529-535.

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Aggiornamento sul genere *Chaetomium* con descrizione di alcune specie coprofile, nuove per l'Italia and **A bibliography of *Podospora* and *Shizothecium*, a key to the species, and a description of *Podospora dasypogon* newly recorded from Italy.** By Franceso Doveri. 2008. Associazione Micologica Bresadola, Cenro Studi Micologici, P.O. Box 292, I-36100 Vicenza, Italy (e-mail: amb@ambbresadola.it). Pp. 160, col. figs 74. [Pagine di Micologia, Numero Speciale no. 29.] ISSN 1122-8911. Price 20 €.

In the covering letter sent to me with this booklet, dated 5 June 2008, Franceso Doveri remarked: "These updates must be regarded as the ideal continuance of my monograph Fungi fimicoli Italici" (Doveri 2004; reviewed in Mycotaxon 90(1): 220-221, July-September 2004). I concur, but they will also be valuable in their own right for those endeavouring to determine collections of the three genera considered.

Chaetomium occupies the first 60 pages, and deals with six species new to Italy, provides updates on others, has a key to the Italian species, and then a key to the 104 known species (including those of *Farrowia*). Original diagnoses of the species new to Italy are provided, with descriptions based on Italian material, and often extensive observations. The keys, descriptions, and observations are given in both English and Italian. Twenty-two species are illustrated in composite plates, all but one comprising superb colour photomicrographs. These often have shots of single perithecia, and show details of their wall structures: those of the cephalothecoid plates in *C. trignosporum* are especially striking (Fig. 22) and were not apparent at all in the SEM micrographs in von Arx et al. (1986: fig. 84) – the SEM does, however, reveal detail of the sometimes characteristic ornamentation on the hairs themselves (Hawksworth & Wells 1973) which is hardly seen by light microscopy.

However, it is the 100-page treatment of *Podospora* and *Schizothecium* that will be especially appreciated internationally, as, after four pages of introduction and description of *P. dasypogon,* the world species of both genera are listed together, alphabetically by species epithet, with places of publication and synonyms. Here I was pleased to see the familiar name *P. anserina* retained over the hardly mentioned *P. pauciseta*; the species epithets date from 1865 and 1852, respectively, and the matter needs to be the subject of a formal proposal for conservation as has been previously pointed out elsewhere (Hawksworth 1994). The number of species accepted is 114, of which 31 occur in Italy. In the case of the Italian species, specimens examined since the 2004 monograph are detailed. Below all the species entries, key references are given by referring to numerals allotted to them in the 213 title bibliography. As in the case of the section on *Chaetomium*, there are again superb colour composite plates which treat 26 species, in some cases with two full-pages of pictures, and including stunning DIC shots of the caudae on the ascospores, as well of asci, perithecial

walls, their setae, etc. Those of the caudae to some extent complement those in Lundqvist (1972), which revealed the gelatinous apparatus of these fungi so splendidly using Indian ink in particular.

As the monograph (Doveri 2004) illustrated microscopic features only by line drawings, supplemented by colour plates only of the macroscopic features of a representative selection of species, this is truly a work to kept by its side. Franceso is to be congratulated on the completion of yet another major work that is sure to receive intensive use.

Arx, JA von, Guarro J & Figueras MJ (1986) The ascomycete genus *Chaetomium*. Beihefte zur Nova Hedwigia 84: 1-162.

Doveri F (2004) Fungi fimicoli Italici. Associazione Micologica Bresdaola, Trento.

Hawksworth DL (1994) Constraints to pest characterization caused by biological nomenclature. In The identification and characterization of pest organisms (Hawksworth DL, ed.): 93-105. CAB International, Wallingford.

Hawksworth DL & Wells H (1973) Ornamentation on the terminal hairs of *Chaetomium* and some allied genera. Mycological papers 134: 1-24.

Lundqvist N (1962) Nordic *Sordariaceae* s. lat. Symbolae Botanicae Upsalienses 20(1): 1-374.

Mikokalitaievbie gribyi (poryadok *Mycocaliciales* Holarktiki [Mycocalicioid fungi (the order *Mycocaliciales*) of the Holarctic]. By Alex N. Titov. 2006. KMK Scientific Press. Moscow, Russia. Pp. 296, figs 26, col. figs 113, figs 26, tables 5. ISBN 5-87317-344-3. Price not indicated.

Mycocaliciales primarily comprise saprobic, fungicolous, and lichenicolous fungi, with stalked ascomata, which generally form a mazaedium. A few species have been considered lichenized, but often these are ones with uncertain biologies. These fungi were formerly included amongst *Caliciales*, and consequently studied by only lichenologists, even though they could hardly be considered lichen-forming. This is the most comprehensive work on these fungi to date, as while the focus is the holarctic region, keys to all known species are included: *Chaenothecopsis* (65 spp. in the world, 58 spp. in the holarctic), *Mycocalicium* (13, 8), *Phaeocalicium* (20, 18), *Protocalicium* (1, 1), *Pyrgidium* (1, 1), *Sphinctrina* (7, 7), and *Stenocybe* (9, 8). The total number of species in the holarctic treated is 102, of which nine are described as new. For all accepted species, there are detailed descriptions and synonymies, details of types, discussions, and information on specimens examined. There are also notes on 26 excluded species. But this is not just a bare taxonomic treatment. The first part of the book devotes a massive 93 pages to the history of their classification, characters (including anamorphs), ecology (with tables showing host trees), distribution (with 26 maps), and SEM micrographs of the ascomata and especially ascospores of selected species. This is an outstanding work, and

even though it is entirely in Russian, I found the keys could be worked with knowledge of a few words and a dictionary. Sadly, it is also a memorial to the author, who died last year. He was clearly a most able and diligent mycologist whose full potential unfortunately could not be realized.

Microfungi occurring on *Proteaceae* in the Fynbos. By Seonju Marincowitz, Pedro W. Crous, Johannes Z. Groenwald & Michael J.Wingfield. 2008. CBS Fungal Biodiversity Centre, P.O. Box 85167, 3508 AD Utrecht, The Netherlands (e-mail: info@cbs.knaw.nl). Pp. vi + 166, figs 88, tables 6. [CBS FUNGAL BIODIVERSITY SERIES no. 7.] ISBN 978-90-70351-71-7. Price 50 €.

Visiting the fynbos shrublands of South Africa in 2005, was to me like imagining seeing life on another planet – and amongst the most spectacular plants there are the *Proteaceae*. As might be forecast, this vegetation type supports a vast array of unique microfungi, and this study is a major step towards getting to grips with that diversity. Litter bags were collected, fungi cultured, and where possible sequenced. Considering that this study is based on just two years' sampling of 29 species and subspecies of but four genera of *Proteaceae*, all in Western Cape Province, it is remarkable how many unusual fungi were discovered. Indeed, "every 2.2 collections represented a different fungal species" (p. 147). In all, 141 species were found, including two genera (*Coniozyma* and *Multisporascus*) and 59 species new to science, 38 species new to South Africa, and 48 new reports on *Proteaceae*. However, although the collections were made only in 2000-2001, this output took eight years to achieve. That 43 % of the total species were new to science and apparently host-specific is of especial interest to those concerned with estimates of fungal diversity on plants. The species are presented alphabetically, with detailed descriptions and discussions, and accompanied by superb coloured photomicrographs. The final sections of the book are concerned with discussions of the diversity of microfungi in the fynbos, their systematic positions, ecology, and succession. The authors "regard the outcome of this study as only representing the tip of the proverbial iceberg" (p. 148) of fungi associated with *Proteaceae*, which has to be the case as this study was admittedly based on limited collecting of only microfungi in a restricted region. It is gratifying that such an in-depth study of the identity of such primarily saprobic fungi could be funded in South Africa, as a similar project on a particular group of plants would be unlikely to be supported in Europe or North America – and if it was would be unlikely to find a publisher. However, as the results show how much novelty can be revealed as a result of intensive collecting and critical study, this will be a useful work to use as leverage in other grant applications.

Lichen-forming fungi

Index nominum lichenum inter annos 1932 et 1960 divulgatorum. By Ivan Mackenzie Lamb. 1963 [Reprint 2004]. Singh Mahendra Palsingh, Dehra Dun, India. [Available from Koeltz Scientific Books, PO Box 1360, D-61453 Königstein, Germany.] Pp. xiii + 809. ISBN 81-211-0566-8. Price 120 €, US$ 185.

Entrusted by the Section Lichenology of the VIII International Botanical Congress in Paris in 1954, the English lichenologist Ivan Mackenzie Lamb (1911-1990), who had then moved via Argentina to North America, worked for a decade on the compilation of an index to lichen names. The work was intended as the natural, indispensable continuation of the monumental Catalogus lichenum universalis by Zahlbruckner (1921-1940). Initially referred to as "Codex lichenum," the work was published by Lamb in 1963 as Index nominum lichenum. The Index lists, in alphabetical order, all taxa of the rank of genus and downwards, and combinations and new names, of lichens which were published subsequently to, and were not included in, Zahlbruckner's volume IX (1934), up to 1960. Furthermore, the Index also contains names that had already appeared in Zahlbruckner's volume X (as they were not enumerated alphabetically), and other the names omitted or overlooked by Zahlbruckner by mistake, and which did not appear in the other important nomenclatural compilation then available, the synonym index of Vainio's Monographia Cladoniarum universalis (1887-1897).

For those pre-computer days, the data gathered by Lamb are really astonishing: altogether, he listed 415 genera, 8205 species, and 6789 infraspecific taxa, a total of 15 409 taxa, with the corresponding full citations. He listed the first reference to new names, reproduced exactly as proposed by their authors, and synonyms, when necessary, with proper citations to the author who proposed the synonymisation (i.e. it was not simply Lamb's "expert assessment"). In the case of new combinations, the basionym was given in the form recognised in Zahlbruckner's Catalogus which was cross-referenced. An important novelty, which added further value to the work, was that he listed names of lichenicolous fungi included in "lichen" genera, when those studying this peculiar group of organisms were relatively few, and the literature particularly difficult to trace. Furthermore, Lamb was compelled to deal with the works of the Italians Ciferri & Tomaselli, who are still mentioned amongst the lichenological community as "those people who published the highest number of illegitimate names in the taxonomic literatures of all times."

The Index deeply reflects the man who compiled it, a highly honest, non-authoritative but absolutely talented researcher well conscious of the importance

of Linnaeus' motto "*Nomina si nescis perit et cognitio rerum*." He humbly spent many years (actually, six more than originally planned) to gather, check and critically note a breath-taking amount of taxonomic literature, which arrived on Lamb's desk at the Farlow Herbarium, Harvard University, also due to the disinterested co-operation of a number of fellow colleagues worldwide ("none mentioned, none forgotten," as he wrote in the short preface to the work). When it appeared, the Index did not receive as much reception and recognition as it deserved, and still deserves. Interestingly, this magnum opus was ignored in one of the two obituaries that appeared after his death to commemorate Lamb's scientific achievements, and was simply cited, but not commented upon, in the other. This probably was due to the work having no pretensions to be taxonomically authoritative, and he did not propose or adopt any taxonomic scheme (as had Zahlbruckner in his Catalogus), and nor did he introduce nomenclatural changes. However, it is certain that Lamb's Index still exceeds all the (very few) name compilations for lichen fungi to have appeared so far for precision, accuracy and dedication.

In the era of databanks online, one could ask why he or she should buy this book, if not already available in the departmental library. Most of the information concerning the names present in the Index is now retrievable on the web, as the informational content has been progressively absorbed by regional or national checklists and databanks. However, most of these instruments do not give the complete references, or they are not immediately available, as the Index does, and *in toto*, with full reliability. An exception is names in the Index Fungorum database, which are now directly linked to copies of the pertinent page in Lamb's Index. But to have it on your desk, or near to it, gives a very positive feeling: information is immediately at your hand, and absolutely verifiable, if you can just retrieve one of the thousands rare, inaccessible journals that Lamb had the determination to track down, and to check. The metaphor of Bernard of Chartres, "we are dwarfs on the shoulders of giants" (John of Salisbury, Metalogicon III, 4) sounds more than pertinent …

The publishers should be complimented for deciding to issue again this Index, especially as it is now very difficult to find an original copy in virtually any antiquarian bookshop. The volume is well printed on high quality, glossy paper, and the cost is relatively low for the amount of information it contains. All lichenologists and other mycologists interested in nomenclature should have a copy in their library.

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Lichen distribution maps: a world index and bibliography. By Peter Scholz. 2007. Thüringische Botanische Gesellschaft e.V., Herbarium Haussknecht, Friedrich-Schiller Universtät Jena, Fürstengraben 1, D-07737, Jena, Germany (e-mail: hmtz@umi-jena.de). Pp. 179. [Haussknechtia Beiheft no. 14.] ISBN not indicated. Price 19.90 €.

This long-expected painstaking compilation, which started over 20 years ago, attempts to include all published distribution maps of lichens and lichenicolous fungi, and represents maps abstracted form 2283 literature sources, the first dating from 1836. The species are listed alphabetically, and the references to maps are in the novel form "B 44" which indicates the 44th paper with an author whose surname starts with "B" listed in the massive 124 page small-type bibliography. There are too many taxa listed to count! Under each bibliographic reference is a note on the number of maps, their scope, and type – and the species covered if rather few. For example, "4 dot maps for bioindication in Luxembourg" under D 30, and "2 grid maps for *Lecanora conizaeoides* and *Lepraria incana* in Rostock (northern Germany)" under G 49." Peter, a teacher of mathematics, has been extremely thorough in tracking down, and searching out, elusive publications – as I know well from visits to my own lichenological library! No similar work ever seems to have been attempted for lichens and lichenicolous fungi, and this is clearly an essential reference work for all lichenological libraries.

Flora of New Zealand – Lichens. By David J. Galloway. 2007. 2nd edn. New Zealand Manaaki Whenua Press, Landcare Research, P.O. Box 40, Lincoln, New Zealand (e-mail: mwpress@landcareresearch.co.nz). Vols 2, pp. cxxx + 2261, col. plates 16. ISBN 10: 0-478-09376-4, 13: 987-0-09376-6. Price NZ $ 79.99.

David Galloway's original Flora of New Zealand – Lichens was a handsome and respected volume published in Wellington in 1985. We now have a second edition, completely rewritten, with many more species and with much greater detail. Now lichenicolous fungi are also included. Altogether there are 1706 taxa, which makes it comparable in scope to the British lichen biota of 1743species. Yet the New Zealand work is much more detailed and better printed than the Lichen flora of Great Britain and Ireland (Purvis et al. 1992), and is all the work of a single individual, in contrast to the large team of writers and editors who struggled for years to produce the British book.

The bulk of the New Zealand volumes consist of accounts of genera and species, alphabetically arranged. Under each genus the type species is listed, after which follows the description, where the reader is referred to the first edition in many instances. Therefore, this second edition should be used in conjunction with the first, and it is not a complete replacement. Following the description is a valuable detailed discussion of the history of the genus, together

with molecular work, which is now the "flavour of the month." At the end are bracketed keys to the species, all concise and of contrasting characters, which is how keys should be.

Under each species (regrettably not numbered) the place of publication is cited, together with any basionyms and synonyms, all with full references. However, the multiple authors on pp. 830 – 831 and 900 – 902 should have been reduced to "et al." in accordance with Rec. 46C. 2 of the Code.

Surprisingly, types are listed separately. Next illustrations are detailed, which include popular books like Dobson's (2000). A detailed description follows, then chemistry, including spot tests and lichen substances. Then there is a single word on world distribution (cosmopolitan, endemic, etc), after which are listed New Zealand localities and habitats, followed by the countries from which it has been recorded, together with references. Last of all comes the jizz. This arrangement should serve as a model for other similar works. The place of publication of names is especially valuable, and elsewhere is even omitted from major floras, such as Stace's New flora of the British Isles (Stace 1991). There are no new names or combinations made.

Taxonomy apart, there are interesting sections on recent lichenological exploration, collectors, authors, biogeography, glossary, etc, as well as 13 keys to genera and 16 excellent colour plates of species. A surprising omission from the numerous acknowledgements listed is the name of Peter W. James, who had David Galloway appointed to the Natural History Museum in London on 5 February 1973, and who recommended his promotion, encouraging his work on New Zealand lichens.

A special feature of the work is the numerous references. The bibliography covers 181 pages, but there are a few mistakes. For instance, on p. 235 under *Caloplaca* "Laundon 1992" is cited but the reference in the bibliography on p. 2095 refers to Laundon's 1992 Lichenologist paper on *Lepraria*, when in fact his account in the Lichen flora of Great Britain and Ireland is intended. There are also problems with the citation on p. 734 of the Ryan et al. reference of 2004b on pp. 2140 – 2141, where 2004b appears twice; is the Wirth 1995 reference on p. 383 1995a or 1995b (p. 2173)?; and to which, if any reference does Wolseley 2002 on p. 336 refer to on p. 2173?), etc. Perhaps David should have been more selective in his literature, then these problems may not have occurred.

A prominent asterisk (*) is used to denote both workers in New Zealand and lichenicolous fungi, yet this fact is not mentioned until p. 2195. The authors of *Caloplaca cerina*, the type species of *Caloplaca* (p. 208), are (Hedw.) Th.Fr., as given in the Botanical Journal of the Linnean Society **147:** 491 (2005). At the end of the book is an excellent glossary, the meaning of the terms clearly and concisely expressed: a model of its kind. Afterwards comes the index,

which would have been more valuable had the trivial names been placed in alphabetical order rather than under genera. Two maps of New Zealand appear at the very end.

The work deserves a wider audience than those concerned with New Zealand. Many lichens have a more extensive distribution than many organisms, and a few have been accidentally introduced. Of the taxa treated, some 367 taxa are cosmopolitan and 171 bipolar, soothe book should appeal to lichenologists worldwide. The two doorstopper volumes should have been divided between the O and P genera, rather than after *Pachyphiale*. Space on shelves should be made available in every lichenologist's library, and they are amazing value for money.

Dobson FS (2000) Lichens: an illustrated guide to the British and Irish species. 4th edn. Richmond Publishing, Slough.

Purvis OW, Coppins BJ, Hawksworth DL, James PW, Moore DM (eds) (1992) The lichen flora of Great Britain and Ireland. Natural History Museum Publications, London.

Stace CA (1991) New flora of the British Isles. Cambridge University Press, Cambridge.

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Contributions towards a new systematics of the lichen family *Thelotrematataceae*. By Andreas Frisch, Klaus Kalb & Martin Grube. 2006. J. Cramer in der Gebrüder Borntrager Verlagsbuchhandlung, Johannesstrasse 3A, D-70176 Stuttgart, Germany (e-mail: mail@schweizerbart.de). Pp. 556, figs 159, plates 26, tables 9. [Bibliotheca lichenologica No. 92.] ISBN 978-3-443-58071-8. Price 88 €.

This volume is based on the PhD thesis of Andreas Frisch, which was carried out at the University of Regensburg under the supervision of Klaus Kalb. The work is divided into three distinct parts. The first is entitled "The lichen family *Thelotremataceae* in Africa" by Andreas alone. The revision is based on collections he made in 19 localities in Cameroon in January-April 1999, and in Tanzania in August-October 1999. Habitats sampled included mangroves, coastal forests, and the eastern mountains including Kilimanjaro. About 1300 collections were made, and in addition some 320 type and other specimens from different herbaria were studied. Ninety-four species are accepted, of which 17 are described as new, and 47 are first records for Africa. In parallel with the segregation of additional genera in *Graphidaceae* by Staiger (2002), 19 genera are now recognized, of which 12 are known in Africa, including two described in this part for the first time: *Acanthotrema* and *Fibrillithecis.* The characters used include apothecial types, structure of the phenocortex, columella types, and especially ascospore structure (e.g. amyloidity in the endospore). Some characters emphasized previously, such as the carbonization of the exciple, proved too variable as generic criteria. For the accepted species,

detailed descriptions are provided with full synonymies and details of types, information on ecology and distribution, and collections other than those from Africa studied are also listed. The whole is well illustrated by macrophotographs of the habit, and also photomicrographs and line drawings of apothecia sections, asci, and ascospores in many of the species. Appendices summarize the species known from different African countries and also the various collection sites.

The first part excludes taxa with complex columella structures, which are dealt with in the second part, co-authored by Klaus Kalb. This revises taxa worldwide with a reticulate or fissured hymenium. Some 650 specimens, including pertinent types, have been examined and 42 species are accepted dispersed through five genera, three of which are newly described (viz. *Gyrotrema*, *Melanotrema*, and *Redingeria*). The largest is *Stegobolus* (26 spp.), a resurrected generic name introduced by Montagne in 1845 and hardly used since. The other genera are much smaller: *Gyrotrema* has one species, *Melanotrema* six, *Ocellularia* four, and *Redingeria* five.

In the final part, the authors combine with Martin Grube to test the robustness of the new systematic proposed by molecular methods using material of 46 species representing 13 of the now recognized genera. There was a "fairly good congruence" (p. 518); *Fibrillithecis, Myriotrema*, and *Ocellularia* formed a monophyletic clade, and the rest of the genera a polyphyletic looser *Thelotrema* cluster. However, *Ampliotrema* was not supported, and the family concept is brought into question by two *Graphis* species clustering with the *Ocellularia* clade. It would be interesting to see the results of an analysis including larger numbers of species, and especially representatives of genera currently placed in *Graphidaceae*.

The contrast of the generic classification proposed here with the three-genera system (viz. *Myriotrema*, *Ocellularia*, and *Thelotrema*) adopted by Mason E. Hale in the early 1980s, can only be described as staggering. The systematics of the thelotrematoid fungi is raised to a new level by this major work, and the generic placement of many Asian and Neotropical species lacking complex columella structures will now have to be revisited. It is an outstanding achievement.

Staiger B (2002) Die Flechtenfamilie *Graphidaceae:* Studien in Richtung einer natürlichen Gleiederung. Bibliotheca lichenologia 85: 1-526.

The lichen family *Graphidaceae* in Australia. By Alan W.Archer. 2006. J. Cramer in der Gebrüder Borntrager Verlagsbuchhandlung, Johannesstrasse 3A, D-70176 Stuttgart, Germany (e-mail: mail@schweizerbart.de). Pp. 191, figs 135, maps 1, tables 4. [Bibliotheca lichenologica No. 94.] ISBN 978-3-443-58073-5. Price 68 €.

This revision accepts 16 genera, 127 species, and two varieties. The largest genera are *Graphis* (54 spp.) and *Phaeographis* (19 spp.). Surprisingly, no new species are described, but there is a single new combination and ten names are

synonymized. In addition, 13 species are excluded for a variety of reasons. While it might at first seem surprising that no new species are included, this is has to be seen in the context of Alan Archer's work on the family in Australia since the late 1990s; new species discovered have been described earlier elsewhere. This is a traditional taxonomic treatment, with keys, descriptions, details of places of publication and types, and paragraphs on chemistry, distribution and ecology, selected specimens examined, and remarks. Most pertinent type specimens appear to have been checked from a wide range of herbaria, and while in some cases "*fide*" appears to indicate they have not, it would have been helpful to have indicated those actually studied more explicity. Chemistry is emphasized, not least in the keys, which is not going to facilitate their use by lichenologists without the necessary facilities for their detection. However, 43 % lack lichen compounds, and 44 % have either norstictic or stictic acid. The figures comprise half-tone habit images (six per page), but surprisingly for this family, there are no drawings or photographs of ascoma sections or exciple structures, and only one of ascospores (of nine species). I would also have welcomed more discussion and analysis of the ecology and distribution of the family in the country; that aspect is only accorded two-thirds of a page, but s surely one on which the author must have a wealth of knowledge from personal field experience. This work would have been at home in a volume of the lichen series in the Flora of Australia.

Lichenological contributions in honour of David Galloway. Edited by Ingvar Kärnefelt & Arne Thell. 2007. J. Cramer in der Gebrüder Borntrager Verlagsbuchhandlung, Johannesstrasse 3A, D-70176 Stuttgart, Germany (e-mail: mail@schweizerbart.de). Pp. xiiii + 603, figs 225, tables 18. [Bibliotheca lichenologica No. 95.] ISBN 978-3-443-58074-2. Price 98 €.

This magnum opus includes 36 contributions from friends and colleagues of David Galloway, arranged in two parts. Part I is a compilation of seven historical accounts (117 pp altogether) and Part II, the bulk of this publication, includes 29 contributions to Southern Hemisphere and tropical lichenology, all arranged alphabetically by first author's name and preceded by a preface.

The first paper by Lars Arvidsson is a summary of David's long lichenological career which took him from his home in New Zealand to the UK in the 1970s, and from here to many other countries both in the North and Southern Hemispheres before going back to New Zealand in the mid-1990s. One of the fruits of this outstanding career is his prolific scientific contribution with over 300 hundred papers written in 40 years of work, which also include a major solo publication, the Flora of New Zealand – lichens, recently much extended and revised and no longer fitting into one volume (see above)! This paper and the editors' Preface also mention David as a devoted husband and

a most generous friend, something that many, including me, can corroborate from our knowledge of him. Of the 18 species named after him, 14 are newly described in the present volume. Arvidsson only includes 16 as he forgot to include *Cladonia gallowayi*, described from New Zealand in 2003, but listed in the on-line Index fungorum and Recent literature on lichens; and *Dactylospora davidii* described as new in the present volume (pp 233-234).

The remaining historical contributions are a miscellaneous collection of papers, starting with David Hawksworth's paper on W. Lauder Lindsay's contribution to New Zealand's lichenicolous fungi, Mark Seaward's paper on Richard Spruce, Kärnefelt & Thell's accounts of Acharius and the early days of the International Association for Lichenology (IAL), Per Magnus Jørgensen's on Norwegian lichenology, and Roland Moberg's insight into Uppsala's herbarium visitor book. All of these papers have a strong link to David Galloway's background, interests, and pursuits. In fact, it was thanks to David's infectious enthusiasm and through his support for the IAL that many of us began to study tropical lichens. And, if I had not read Kärnefelt& Thell's account, probably I would not have realised that there had been so much going on in the IAL prior to David Galloway's presidency of the fourth council. Though some things have not changed much from the early days, as far back as 1977, Irwin Brodo (the penultimate President) was already expressing his concern regarding the financial situation of the Association, as the dues did not cover much beyond the cost of printing the newsletter. Also, despite an increased focus on Southern Hemisphere and tropical lichenology, the lichen researchers are still mostly from Northern countries (e.g. of about 56 contributors to this volume, only 12 are from the South).

The second part includes the taxonomic, floristic, and ecological contributions to this festschrift. In time, the contributions of this section might not be comparable in systematic relevance to that of Josef Poelt's homage of 1984, also referred to as the "900 page lichen bible," but it will certainly be much cited by researchers of tropical lichens after Galloway's (1991) edited volume on tropical lichens. The taxonomic and nomenclatural novelties in the text amount to: 45 new genera, species, and infraspecific taxa (all clearly illustrated with photographs and line drawings), and 26 new combinations. Most of the contributions, except for Thell and collaborators on the phylogeny of the Antarctic genus *Himantormia*, do not include molecular data, but are substantial taxonomic accounts which might include keys; e.g. Frödén and Kärnefelt on the genus *Teloschistes* in Africa, Hafellner & Mayrhofer's on lichenicolous fungi of New Zealand (these two the largest contributions to the text with ca 20 pages each), Hertel's paper on new records of lecideoid lichens from the Southern Hemisphere, Kalb's new taxonomic and nomenclatural novelties (pp. 297-316), and Kondratyuk and collaborators' 19 new species of

the genus *Caloplaca* in Australia. Unfortunately the authors of the latter do not provide a key for this highly diverse and difficult genus.

Also in this section there are three lichen community contributions by Lewis-Smith on the small Antarctic island of Signy (pp. 387-403), Wirth et al. on the lichens of the Central Namib Desert (pp. 555-582), and Wolseley et al. on the lichens of Malaysian dipterocarp forests (pp. 583-603), the latter being the continuation of a survey started by David Galloway in his final years of employment at the Natural History Museum. Biogeography, a subject that David Galloway championed for lichens, is included in the contributions by Hafellner & Mayrhofer mentioned earlier (pp. 257-258), in Quillot and collaborators (pp. 479-488) who compare the lichen of Antarctica and Chile, and Randlane & Saag (pp. 489-499) address the distribution patterns of cetrarioid lichens in the Southern Hemisphere.

As a whole the book is well written and illustrated and has few typographical errors, e.g. a missing caption on p. 441 for fig. 3G, and the IAL newsletter acronym changed from ILN to INL on p.87. The photographic reproduction quality has improved from earlier volumes of this series, and it now rivals those of more upmarket scientific publications. I found the price of the paperback also rather competitive and in line with publications of similar scope. This is certainly a nice memento for David, and an important contribution to the subject.

Galloway DJ (ed.) (1991) Tropical lichens: their systematics, conservation, and ecology [Systematics Association Special Volume, No. 43.] Clarendon Press, Oxford.

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Lichenologische Nebenstunden. Contributions to the lichen taxonomy and ecology in honour of Klaus Kalb. Edited by A. Frisch, U. Lange & B. Staiger. 2007. J. Cramer in der Gebrüder Borntrager Verlagsbuchhandlung, Johannesstrasse 3A, D-70176 Stuttgart, Germany (e-mail: mail@schweizerbart.de). Pp. 343, figs 110, tables 14. [Bibliotheca lichenologica No. 96.] ISBN 978-3-443-58075-9. Price 74 €.

This book has been edited by Klaus Kalb's students to honour him on his 65th birthday, and, like the previous volume in the series (see above), it is a tribute to his contribution to (mostly tropical) lichenology. It includes 27 papers, mainly on systematics and taxonomy, six of which discuss tropical collections. As before, the arrangement of the contributions is in alphabetical order by first author, preceded by a preface, and an introduction of Klaus Kalb's lichenological achievements by David Galloway. As the list of taxa described or recombined by Klaus is extraordinarily long, extending over ten pages, a separate paper is included at the end of this festschrift. Also in this paper we are made aware that lichenologists have been ready to appreciate his contribution earlier and

thus have dedicated to him a total of 32 taxa, including three new genera, of which only eight are introduced as new to science in the present volume.

Many of the authors contributing to the previous volume have also papers in this one, and the treatments follow similar layouts, with good descriptions and illustrations for the new taxa, and keys where appropriate. Nevertheless, a few more papers embrace the use of molecular data to support or discuss current systematic emplacements of the taxa, e.g. Bylin and collaborators' on the phylogenetic study of the *Fuscideaceae* (pp. 49-60), Lohtander et al.'s treatment of *Physconia* in Russia (pp. 175-184) which also describes two new species in the genus, and Nordin et al.'s (pp. 247-266) presentation of preliminary molecular data on 26 species of *Aspicilia* from Fennoscandia. This information is always compared with morphological and chemical variation. Although the majority of taxonomic and nomenclatural novelties in the text (42 and six respectively) are from lichenologically less explored regions and continue to support Aptroot's prediction that at least 50 % of tropical forest lichens remain undescribed, there is still work to be done in Europe. Thus the papers by Harrie Sipman (pp. 267-277) and Søchting, Huneck & Etayo (pp. 279-286) describe four and one new species respectively from Greece, Germany, and Spain.

Although Kalb's 89 research papers and input to the subject in the last 40 years might seem by comparison to that of Galloway's more 'modest', I would direct you to the last paragraph of Marcelli and collaborators' article on p. 225, where they not only dedicate this contribution to their teacher and friend, but show Klaus as a generous human being. I was very moved by their simple and effective way of saying thank you. I am sure he is very proud of them, and hope that his own contribution to the subject will not stop at 65!

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Corticolous crustose and microfoliose lichens of northeastern Brazil. By Marcela Eugenia da Silva Cáceres. 2007. IHW-Verlag, Postfach 1119, D-85378 Eching bei München, Germany (e-mail: dr.schmidt@ihwverlag.de). Pp. 168, figs 34 (ca 12 col.), tables 1. [Libri Botanici No. 22.] ISBN 978-3-930167-68-5. Price 27.90 €.

This report is based on a PhD carried out under the supervision of Gerhard Rambold (Universität Bayreuth), with assistance from Robert Lücking in particular, amongst others. Collections were made in 22 localities in the north-eastern coastal strip of Brazil, which includes parts of five states, in 2000-2002. The vegetation is a mixture of Atlantic forests and adjacent inland mediterranean-like Caatinga. Of 456 collections made, 426 were named; 383 to species, 25 tentatively to species, 18 only to genus, with 30 sterile crusts. Eighteen species are described as new, and 14 new combinations are made.

That so many new species were found in only 22 sites testifies to the extent of undiscovered lichen diversity in the region. Amongst the new species, is the first lichenized *Plectocarpon* discovered, *P. syncesioides* – making *Plectocarpon* yet another example of a genus with species that have crossed biological relationship boundaries. The number of genera treated is 114, and there is a key to these, and then separate keys to species under each generic entry. For each species the specimens studied are listed, and then, in some cases, notes are added. What is most appealing in the book are the stunning 12 pages of colour images, with eight species per page. These are all macroscopic, and include many lichens for which coloured images have not previously been published; photomicrographs and drawings of internal structures and ascospores are lacking. There is so little published on bark-inhabiting lichens in the neotropics, that this is an important milestone for the region, and one which will also facilitate the identification of the often neglected crustose species by ecologists as well as lichenologists. A most commendable piece of work.

Flechten Madeiras, der Kanaren und Azoren. By Felix Schumm. 2008. F. Schumm, Mozartstraße 9, D-73117 Wangen, Germany (e-mail: fschumm@online.de). Pp. iv + 294, col. figs. ISBN 978-3-00-023700-3. Price 40 €.

This privately printed book is a well-illustrated introduction to the lichens of the Azores, Canary Islands, and Madeira, with an emphasis on the macrolichens. Each of the 247 species treated has a whole page, half to two-thirds of which comprise photographs of the thalli, with close-ups of diagnostic features, and in some cases stained sections of ascomata or thalli, and ascospores. The format demands that there is little space for detailed descriptions, so these are brief, and sometimes in smaller type where space is especially critical, but they do include quite detailed information on the chemical compounds produced, and an indication of habitat and island groups on which they occur. In addition to being a valuable guide for lichenological visitors, the book is of wider interest in containing the first coloured images of several species known only from the islands, such as *Cladonia macaronesica, Hypogymnia madeirensis, Ramalina madeirensis*, *Roccella canariensis,* and *Xanthoparmelia madeirensis*. There are also keys provided to all species of selected genera in the islands, which are especially species rich, including *Heterodermia* (12 spp.), *Hypotrachyna* (12 spp.), *Punctelia* (10), *Roccella* (15), and *Xanthoparmelia* (11). The author is a skilled amateur, and this production has clearly been undertaken because of his deep affection for lichens in the Atlantic islands.

Lichenológia – a zuzmók tudománya. By Edit Farkas. 2007. MTA Ökológiai és Botanikai Kutatóintézete, Alkotmány u. 2-4, 2163 Vácrátót, Hungary. Pp. 193, figs 48 (some col.), tables 12. ISBN 978-963-8391-38-4. Price 2000 Ft.

Not an identification guide, but a textbook of lichenology in Hungarian by the leading lichenologist in the country. Such works in national languages are essential to interest the students and naturalists in these fascinating fungi. It is wide-ranging, discussing the history of lichenology from earliest times to the molecular era; methods of study, chemical reactions, preservation of specimens; structure, reproduction and growth; physiology and ecophysiology; phytosociology (drawing especially on the studies of the late and most active Gallé László, 1908-1980); interactions with other organisms; an overview of classifications from the early 19th century to date, with current placements down to the genus level; bioindication of air pollution and ecological continuity, lichenometry, and other uses. The work concludes with 21 pages of references, an index to scientific names (including phytosociological ones), and a subject index. The whole is well presented, and will surely contribute to the promotion of lichenology in Hungary if it can become sufficiently widely distributed.

The lichens of the Tartry Mountains. By Eva Lisiká. 2005. VEDA, Slovak Academy of Sciences, Bratislava. Pp. 439. ISBN 80-224-0826-3. Price not indicated.

This book is in the best traditional of central European regional syntheses of information on lichens and lichenicolous fungi. It consists of an alphabetical list of 1119 lichen-forming and 60 lichenicolous fungi, of which 882 species of lichens and 37 lichenicolous fungi occur on the Polish side of the Tartra Mountains that form part of the Carpathian range. For each species, information on the habitat and distribution, and occurrences in particular regions are detailed with full collection information and references to literature and/or herbaria. A staggering 1753 synonyms are listed and cross-referenced, and the literature cited has over 400 entries. While the overall impression is of an extremely rich lichen biota, 31 species are listed as extinct, and a further 19 are now protected by law in the region. I was especially interested to note that one species of *Bryoria*, *B. smithii* was now extinct and that no less than seven other species in the same genus were now protected. Members of this genus have also declined dramatically in the UK. This painstaking compilation provides a baseline from which to measure future changes in the lichens of the region, as well as a key work for those exploring or endeavouring to identify lichens in the Carpathian mountains. The author is to be congratulated on bringing this compilation together.

Miscellaneous

Order out of chaos: Linnaean plant names and their types. By Charlie Jarvis. 2007. Linnean Society of London, Burlington House, Piccadilly, London WIV 0BF, UK. Pp. xii + 1016. illust. ISBN 978-0-9506207-7-0. Price £ 80.

This stupendous work is the culmination of the Linnaean Plant Name Typification Project, which was started in 1981. It covers all taxa treated as plants by Linnaeus, including fungi of all kinds. There is detailed discussion of how the typification of Linnaeus' names should be attempted, a summary of Linnaeus' life, and detailed discussions of works used by Linnaeus. The major part of the book, however, comprises entries for all species accepted by Linnaeus, listed alphabetically regardless of taxonomic group, with information as to original source, typifications made, notes on original material, and current names where known. This is an important reference work for mycologists dealing with names adopted by Linnaeus, and now needs to be the starting point when considering their typifications. The book is large-format and beautifully presented, and further is illustrated by examples from the Linnean collections, along with often-coloured illustrations from some of the important earlier historical works. It should be available in all major systematic libraries.

Fungi in the ancient world: How mushrooms, mildews, molds, and yeast shaped the early civilizations of Europe, the Mediterranean, and the Near East. By Frank Matthews Dugan. 2008. American Phytopathological Society Press, 3340 Pilot Knob Road, St Paul, MN 55121, USA. Pp. xi + 140, 13 figs. ISBN 978 0 89054 361 0. Price US $69.

This book, while not a systematic one, is included here as it contains much material that will be of value to teachers of mycology wishing to emphasize the multifarious ways in which fungi have been a part of, and influenced the development of, human civilizations. The topics considered are: baking and brewing, edible fungi, entheogens, poisonous fungi and mycotoxins, medicinal uses, plant and animal (including human) pathogens, rots, ecological roles, fungi in glacial ice or permafrost, ancient illustrations, folklore, ideas of fungal biology, and some miscellaneous attributions. There is, as in any work reaching back in time, a mixture of hard data with speculation based on meager clues. This adds to the book's interest, especially when considering topics sure to be contentious or even cause offence with some (not me), such as mentioning "Jesus ('the drug Man')" as "a minority view, albeit an entertaining one." Just what balance of coverage to accord to particular aspects, and what to include or not, must have been difficult choices to make, and no two mycologists would be likely to agree. I can understand reluctance not to broaden the geographical scope of the book to the Far East where so much information is to be found in works never translated into English, but, coming from the desk of a mycologist in North America, it would have been great if North and South American native people's involvement with mushrooms could also have been considered. Perhaps there will be more from these geographical areas, and more recent examples, in the author's forthcoming Fungi, folkways and fairy tales, stated to be

"in press"? Nevertheless, a great deal of research and reading has gone into the preparation of this most readable, well referenced, and, if anything, too slim, volume. I do hope the rather high price for such a modestly sized soft back will not deter too many potential mycological purchasers after an educating and enjoyable read for a long flight.

The Air Spora: A manual for catching and identifying airborne biological particles. By Maureen E. Lacey & Jonathan S. West. 2006. Springer, PO Box 17, 3300AA Dordrecht, The Netherlands. Pp. xv + 156, illustrated (incl. 12 coloured plates). ISBN 10: 0 387 30252 2, 13: 978 0 387 30252 2. Price £69 (recommended).

This is designed as a manual for those endeavouring to identify biological propagules in the air. The Rothamsted Experimental Station (Harpenden, UK) has a long and distinguished record in this field, especially since the pioneering work of Philip H. Gregory, later Jim M. Hirst, and subsequently John Lacey (who was married to Maureen). Six of the chapters are concerned with background material, spore trapping and sampling methods, basic microscopy, and counting, and one with identification. The identification chapter has just three pages of text and eight full-page plates of pollen and spore paintings, all at x1000. Four of the plates are devoted to fungi, and these together have paintings of 212 single spores, mainly from the UK but with some from Costa Rica, India, the USA or elsewhere. Many are named to species, but others to only to genus or merely, for example "ascospore, Costa Rica." It is not clear on what basis the selection was made. The paintings have been prepared largely by Maureen from fresh specimens or cultures, and not only trapped spores. Their quality is rather variable, and good interference contrast photographs would have been preferable; the paintings do not even show the longitudinal germ-slits of the representatives of three of the *Xylariaceae* included clearly.

There are some cautionary words on p.91 that the plates "will often give a hint of identification," but the text does not give an impression of the numbers of pollen and spore types that exist, and consequent problems of identification. The need in some cases to culture fungi from trapped spores in order to make an identification is not explained. Single spores cannot indicate the range of variation in a species, especially conidial fungi, and as there are no indications of numbers of species with similar spores, despite the admonitions, users will be tempted to make species identifications which are in reality suspect. For example, there is a danger that any *Pestalotiopsis*-type conidium found is likely to be referred to as *P. theae.* There are two spores labeled as *Curvularia lunata* that certainly differ, one from India and one from Singapore; one is almost twice as large as the other and has a massive central cell – both cannot be *C. lunata*. There is thus a danger of numerous misidentifications being made which could have quarantine, plant or human health, or economic repercussions. Can

Penicillium marneffei (human pathogen) or *Phoma lingam* (plant pathogen) be confidently identified from the conidia? Further, very few references to potentially helpful texts are provided.

There is a brief glossary, 12 pages of references, and, at 16 pages, a disproportionately detailed index. Perhaps not surprisingly, there is a strong UK focus as regards institutions mentioned, and all the suppliers listed in an Appendix are from the UK. The book is spirally bound, presumably in anticipation of intensive use by the microscope, but that would be regrettable with respect to identifications. This book is really one for the newcomer to sampling and trapping methods in aerobiology, and not one for the aerobiologist to use when making identifications. It is also available as an e-book (ISBN 10: 0 387 30253 0, 13: 978 0 387 30253 9).

Plant taxonomy: the systematic evaluation of comparative data. By Tod F. Stuessy. 2009. 2nd edn. Columbia University Press, New York, U.S.A. Pp. xxiii + 539, illustrated. ISBN 978-0-231-14712-5. Price £ 71.50.

In the absence of a mycological text on the principles of taxonomy, in my days as a fledgling taxonomist I was an avid user of Davis & Heywood (1963), which was then hot off the press – to the extent that my paperback copy disintegrated and had to be replaced by a hardbound one. After that work went out of print, the niche it had occupied was partly taken over by Tod Stuessey's book, the first edition of which was published in 1990, and in recent years I have been commending that book to graduate students instead. I state "partly" as Tod, who is currently Secretary-General of the International Association for Plant Taxonomy (IAPT) and based in Vienna, does not enter the minefields of nomenclature and typification. Neither does he consider fungi, for which I am glad under such a title, as that could have continued to perpetuate the myth that mycology is a part of botany. What the book does contain which makes it of value to mycologists, are: discussions of classification systems, approaches to classification (the natural, phyletic, phenetic, and cladistic); generic, species, and infraspecific rank concepts; types of taxonomic data, including the molecular and genetic; and the handling of taxonomic data. It is also a way into the broader systematic literature, with the "Literature Cited" section occupying a massive 129 pages in small type. If you are a mycologist wishing to get to grips with basic taxonomic concepts and methodologies, this is now the ideal starting point.

Davis PH, Heywood VH (1963) Principles of angiosperm taxonomy. Oliver & Boyd, Edinburgh.